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FOREWORD

In 1939 the Acoustical Society of America published a cumulative index to all papers which had appeared in the first ten volumes of its journal, as well as an index to many of the acoustical papers which had been printed in other journals during the same ten-year period. It had been the plan to extrapolate that experience and to publish a similar cumulative index covering the next ten volumes. This turned out to be a very serious financial problem. The field of acoustics had become very active during the period, the number of titles of acoustical papers compiled from other journals had vastly multiplied, the reviewing of acoustical patents had been started, and the *Journal* itself was publishing an increasing number of papers per year. It was reluctantly decided that the cumulative index would have to be abandoned for financial reasons.

Meantime, however, the Office of Naval Research had made plans to support the preparation of a bibliography of acoustics. By good fortune the plans of each group became known to the other. Inasmuch as the *Journal of the Acoustical Society of America* was the only journal devoted to acoustics which had been published throughout the entire period from 1939 to 1948 and, since this journal had already prepared references to acoustical literature appearing elsewhere and to acoustical patents, it was concluded that the cumulative index of this material would meet the needs of the Office of Naval Research. Compilation of this material into integrated lists has therefore been supported by ONR Contract N8 onr 78,200.

Workers in acoustics are indebted to the compilers listed on the previous page, whose many hours of work during the past ten-year period have made this index possible.

March 1949 — FLOYD A. FIRESTONE, *Editor*

HOW TO USE THIS INDEX

All material is indexed both according to author or inventor and analytically by subject in accordance with the Classification of Subjects on page vii. Any reference simply to the *Journal* means *Journal of the Acoustical Society of America*.

The most straightforward method of locating material is by the name of the author or inventor, when this is known. As shown in the Table of Contents, the Author Index to the *Journal* is separate from the Author Index to Contemporary Acoustical Literature which lists papers in other journals, as well as books. The Inventor Index to Acoustical Patents is still a third list.

The same material which appears in the author and inventor indexes has been relisted in three analytic subject indexes, as shown in the Table of Contents, covering respectively: *Journal* papers, abstracts, reviews, letters, etc.; books and acoustical papers appearing in other journals; and acoustical patents. Consequently, in order to cover completely any acoustical subject, it is necessary to look in all three analytic subject indexes. The subjects under which all material has been classified are listed in the Classification of Subjects on page vii, the field of acoustics being divided into thirteen subject matter fields, each of which is further divided into a considerable number of decimally numbered subjects. In the Analytic Subject Index to the *Journal*, each subject is further divided into three parts entitled *Papers*, *Subtitles*, and *Abstracts*. Under Papers will be found the original titles of all the papers appearing in the *Journal* on that subject. Under Abstracts are listed the titles of the papers presented at meetings. Since a great amount of valuable material appears in the *Journal* in papers whose titles cannot fully describe all the subjects which the papers cover, many of the subtitles of papers have been indexed under the heading *Subtitles*. When subtitles covering the material did not appear in the paper, they were written; captions of some of the figures were also included under this heading. Thus, while the Subtitles portion of the index is informal, it is hoped that it will increase the possibility of finding the desired information quickly.

References on most subjects can be located immediately by a logical use of the Classification of Subjects on page vii. In case the reference sought is of an unusual character such that there is uncertainty as to the subject under which it might have been classified, this can usually be found quite quickly by the process of eliminating the sections and subjects under which it is quite improbable that it might have been listed. In case of doubt, a title has often been listed under a number of subjects.

The patent indexes show the volume of the *Journal* and page on which can be found a brief review of the patent usually accompanied by a figure. A numerical index of patents is included for locating further information on an acoustical patent when only the patent number is known. The Correlation of Journal Classification with Patent Office Classification enables one to find patent reviews on a given subject when the Patent Office classification is known. Also, the Correlation is a guide to placing a standing subscription to patents in certain Patent Office classifications corresponding to specified acoustical subjects, or for searching the files of the Patent Office on these acoustical subjects.

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2.6 Noise Reduction by Increased Room Absorption

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2.9 Sound Transmission, Theory and Methods of Measurement of
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2.10 Sound Insulating Structures. Values of Transmission Coefficients (continued)

2.11 Vibration Insulating Supports

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4. The Ear and Hearing

4.1 General, Unclassified

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4.3 Binaural Hearing. Localization
4.4 Deafness

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4.5 Instruments Relating to Hearing, and for the Testing of Hearing

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4. THE EAR AND HEARING

4.5 Instruments Relating to Hearing, and for the Testing of Hearing (continued)

4.5 Instruments Relating to Hearing, and for the Testing of Hearing (continued)

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4. THE EAR AND HEARING

4.5 Instruments Relating to Hearing, and for the Testing of Hearing (continued)
4.6 Loudness. Threshold Determinations

4.5 Instruments Relating to Hearing, and for the Testing of Hearing (continued)

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4. THE EAR AND HEARING

4.6 Loudness. Threshold Determinations (continued)
4.7 Masking
4.8 Phase Effects
4.9 Pitch

4.6 Loudness. Threshold Determinations (continued)

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4. THE EAR AND HEARING

4.9 Pitch (continued)
4.10 Subjective Tones
4.11 Theories of Hearing
4.12 Timbre
4.13 Ear Acoustical Impedance

4.9 Pitch (continued)

Interpretation of loudness, pitch, and masking phenomena with regard to the two-canal theory of cochlea mechanics. L. A. deRosa. **20:** 591—1948

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4.12 Timbre

PAPER

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ABSTRACT

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4.13 Ear Acoustical Impedance

ABSTRACT

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5. APPLIED ACOUSTICS. INSTRUMENTS AND APPARATUS
5.1 General, Unclassified
5.3 Acoustical and Mechanical Impedance Measurement

5. Applied Acoustics. Instruments and Apparatus

5.1 General, Unclassified

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5. APPLIED ACOUSTICS. INSTRUMENTS AND APPARATUS

5.3 Acoustical and Mechanical Impedance Measurement (continued)

5.4 Analyzers and Filters, Mechanical and Electrical. Acoustic Filters. Oscillographs

5.3 Acoustical and Mechanical Impedance Measurement (continued)

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Acoustical impedance measurement bibliography. William M. Hall. **11:** 149—1939

Apparatus for measuring mechanical impedance. Georg v. Békésy (Akustische Zeits. **4**, 316 (1939)). **11:** 487—1940

Short-tube method for measurement of impedance. Richard K. Cook. **19:** 922—1947

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5.4 Analyzers and Filters, Mechanical and Electrical. Acoustic Filters. Oscillographs (see also 5.15)

PAPERS

Degenerative sound analyzer. H. H. Scott. **11:** 225—1939

Analysis of pulses by means of the harmonic analyzer. Robert S. Shankland. **12:** 383—1941

Elastic wave filtration in nonhomogeneous media. R. B. Lindsay. **12:** 378—1941

Transmission of sound through parallel conduits. L. W. Labaw. **12:** 232—1940

Acoustic filtration by membranes. L. W. Labaw. **13:** 353—1942

Acoustic filtration in parallel conduit structures. L. W. Labaw. **13:** 345—1942

Analyzer for sub-audible frequencies. H. H. Scott. **13:** 360—1942

Laryngeal ventricle considered as an acoustical filter. Abe Pepinsky. **14:** 32—1942

Acoustic sound filtration and hearing aids. Frederick M. Grossman and Charles T. Molloy. **16:** 52—1944

R-C filter circuits. G. J. Thiessen. **16:** 275—1945

Introduction to technical discussions of sound portrayal. Ralph K. Potter. **18:** 1—1946

Portrayal of visible speech. J. C. Steinberg and N. R. French. **18:** 4—1946

Sound spectrograph. W. Koenig, H. K. Dunn, and L. Y. Lacy. **18:** 19—1946

Visible speech cathode-ray translator. R. R. Riesz and L. Schott. **18:** 50—1946

Visible speech translators with external phosphors. Homer Dudley and Otto O. Gruenz, Jr. **18:** 62—1946

Investigations on acoustic resonators. H. Samulon. **19:** 191—1947

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Amplitude cross-section representation with the sound spectrograph. L. G. Kersta. **20:** 796—1948

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Method for changing the frequency of a complex wave. E. L. Kent. **14:** 128—1942

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Acoustic filters for supercharged diesels. Ch. H. Voelker. **20:** 588—1948

5. APPLIED ACOUSTICS. INSTRUMENTS AND APPARATUS

5.4 Analyzers and Filters, Mechanical and Electrical. Acoustic Filters. Oscillographs (continued)
5.5.1 Broadcasting
5.7 Frequency Standards. Frequency Measuring and Recording Instruments
5.8 Loudspeakers, Horns

5.4 Analyzers and Filters, Mechanical and Electrical. Acoustic Filters. Oscillographs (continued)

SUBTITLE

Octave filter oscillograph. Vern O. Knudsen. **11:** 34—1939

5.5.1 Broadcasting

PAPERS

Performance of broadcast studios designed with convex surfaces of plywood. C. P. Boner. **13:** 244—1942

"Higher fidelity" in sound transmission and reproduction. George M. Nixon. **17:** 132—1945

Problems of high altitude communication. J. Weichbrod. **18:** 161—1946

Training for voice communication. John W. Black and Harry M. Mason. **18:** 441—1946

Acoustic constant of enclosed spaces correlatable with their apparent liveness. J. P. Maxfield and W. J. Albersheim. **19:** 71—1947

Convex wood splays for broadcast and motion picture studios. Michael Rettinger. **19:** 343—1947

Effects of impulsive interference upon a-m voice communication. J. C. R. Licklider and S. J. Goffard. **19:** 653—1947

Frequency range preference for speech and music. Harry F. Olson. **19:** 549—1947

Premodulation clipping in a-m voice communication. K. D. Kryter, J. C. R. Licklider, and S. S. Stevens. **19:** 125—1947

Review of criteria for broadcast studio design. H. M. Gurin and G. M. Nixon. **19:** 404—1947

ABSTRACTS

Contemporary problems in television sound. C. L. Townsend. **13:** 334—1942

Acoustics for broadcasting studios for speech *versus* music. Edward J. Content. **15:** 80—1943

Materials and construction for speech broadcasting studios. Lonsdale Green, Jr. **15:** 80—1943

Practical considerations of "higher fidelity" in sound transmission and reproduction. George M. Nixon. **17:** 102—1945

Acoustic constant of enclosed spaces correlatable with their apparent liveness. J. P. Maxfield and W. J. Albersheim. **19:** 288—1947

Convex wood splays for broadcast and motion picture studios. Michael Rettinger. **19:** 287—1947

Effects of noise on radio communication. J. C. R. Licklider and S. J. Goffard. **19:** 734—1947

Frequency range preference for speech and music. Harry F. Olson. **19:** 731—1947

Review of criteria for studio design. George M. Nixon and Herman M. Gurin. **19:** 287—1947

Use of irregular boundaries in studio design. K. C. Morrical. **19:** 287—1947

SUBTITLES

Discussion on broadcasting studio symposium. William A. Jack. **19:** 255—1947 L. E.

Transmission and reception of sounds under combat conditions. G. A. Miller and F. M. Wiener. **20:** 880—1948 B.R.

5.7 Frequency Standards. Frequency Measuring and Recording Instruments

PAPERS

Terminology for logarithmic frequency units. Robert W. Young. **11:** 134—1939

Further applications of our direct-reading pitch and intensity recorder. Jûichi Obata and Ryûji Kobayashi. **12:** 188—1940; Corrigenda. 449—1941

Measurements of orchestral pitch. O. J. Murphy. **12:** 395—1941

Method of measuring audiofrequencies. Don Lewis and Paul E. Griffith. **12:** 412—1941

Use of counter circuits in frequency dividers. E. L. Kent. **14:** 175—1943

Recording Lissajous figures. Wayne B. Hales. **16:** 137—1945

Frequency standard for use at high and low frequencies. Rogelio P. McLoughlin. **17:** 46—1945

Lissajous figures. I. Bernard Cohen. **17:** 228—1946

Electrical method of measuring the intonation of cup mouthpiece instruments. J. C. Webster. **19:** 902—1947

ABSTRACTS

Table relating frequency to cents. Robert W. Young. Book. **11:** 255—1939

Terminology for logarithmic frequency units. R. W. Young **11:** 166—1939

Method of measuring audiofrequencies. Don Lewis and Paul E. Griffith. **12:** 471—1941

Recording of small pitch-variations. M. Grützmacher and W. Lottermoser. (Akustische Zeits. **5**, 1 (1940)). **12:** 309—1940

Demonstration of the chromatic stroboscope as a general purpose frequency meter. O. H. Schuck and R. W. Young. **13:** 82—1941

Method for measuring the frequency of vibration or rotation. E. L. Kent. **14:** 128—1942

The vibration. Frank Rieber. **17:** 100—1945

Stroboscopic frequency measurement. Earle L. Kent. **19:** 731—1947

SUBTITLES

Frequency level as a semitone count. Robert W. Young. **11:** 137—1939

On frequency measurement. **17:** 67—1945

5.8 Loudspeakers, Horns (see also 5.13 and 5.17)

PAPERS

Acoustical impedance of an infinite hyperbolic horn. J. E. Freehafer. **11:** 467—1940

Interaction impedance of a system of circular pistons. S. J. Klapman. **11:** 289—1940

5.8 Loudspeakers, Horns (continued)

Power transmission loss in exponential horns and pipes with wall absorption. William D. Phelps. **12:** 68—1940

Low frequency horn of small dimensions. Paul W. Klipsch. **13:** 137—1942

Theory of conical sound radiators. W. N. Brown, Jr. **13:** 20—1941

Acoustic design charts. Frank Massa. **14:** 115—1942

Experiments with the noise analysis method of loudspeaker measurement. Benjamin Olney. **14:** 79—1942

Improved low frequency horn. Paul W. Klipsch. **14:** 179—1943

Conditions for wide angle radiation from conical sound radiators. Richard W. Carlisle. **15:** 44—1943

Mechanical impedance bridge. A. M. Wiggins. **15:** 50—1943

Action of a direct radiator loudspeaker with a non-linear cone suspension system. Harry F. Olson. **16:** 1—1944

Production of inharmonic subfrequencies by a loudspeaker. R. V. L. Hartley. **16:** 206—1945

Acoustic intensity distribution from a "piston" source. A. O. Williams, Jr. **17:** 219—1946

Conical sound source. Piero Giorgio Bordoni. **17:** 123—1945

Erratum: addendum on conical sound source. Piero Giorgio Bordoni. **17:** 338—1946

General theory of passive linear electroacoustic transducers and the electroacoustic reciprocity theorem. I. Leslie L. Foldy and Henry Primakoff. **17:** 109—1945

Generalized plane wave horn theory. Vincent Salmon. **17:** 199—1946

High quality loudspeaker of small dimensions. Paul W. Klipsch. **17:** 254—1946

New family of horns. Vincent Salmon. **17:** 212—1946

Directional characteristics of a free-edge disk mounted in a flat baffle or in a parabolic horn. Frank H. Slaymaker, Willard F. Meeker, and Lynn L. Merrill. **18:** 355—1946

Fifty horsepower siren. R. Clark Jones. **18:** 371—1946

Asymmetrical vibrations of cones. Piero Giorgio Bordoni. **19:** 146—1947

Cones as underwater transducer reflectors. Roland E. Mueser. **19:** 952—1947

Coordinates and the reciprocity theorem in electro-mechanical systems. John W. Miles. **19:** 910—1947

General theory of passive linear electroacoustic transducers and the electroacoustic reciprocity theorem. II. Henry Primakoff and Leslie L. Foldy. **19:** 50—1947

Simplified method for determining transducer directivity index. Paul M. Kendig and Roland E. Mueser. **19:** 691—1947

Two parabolic reflector underwater transducers. J. R. Reitz and R. E. Mueser. **19:** 35—1947

Violation of the reciprocity theorem in linear passive electromechanical systems. H. Jefferson. **19:** 502—1947

Electromechanical feedback. Jan de Boer and Gerrit Schenkel. **20:** 641—1948

ABSTRACTS

Interaction impedance of a system of circular pistons. S. J. Klapman. **11:** 165—1939

Apparatus for measuring the total sound power radiated by small sources. R. L. Hanson and E. M. Boardman. **12:** 461—1941

Comparison between piezoelectric and electromagnetic coupling. Karl S. Van Dyke. **12:** 461—1941

Generalized plane wave horn theory. V. Salmon. **12:** 473—1941

Method of measuring the total output of speakers. Darrell B. Green. **12:** 461—1941

Power transmission loss in exponential horns and pipes with wall absorption. William D. Phelps. **12:** 461—1941

System concept in electroacoustical systems. Hugh S. Knowles. **12:** 473—1941

System concept of electroacoustical systems. Hugh S. Knowles. **13:** 81—1941

Automatic direct inking audiofrequency response recorder. Benjamin Olney. **14:** 129—1942

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General proof of the reciprocity theorem for electro-acoustic transducers. Leslie L. Foldy and Henry Primakoff. **17:** 102—1945

Directional characteristics of a free-edge disk mounted in a flat baffle or in a parabolic horn. Frank H. Slaymaker, Willard F. Meeker, and Lynn L. Merrill. **18:** 251—1946

Discrimination of transducers against reverberation. T. H. Schafer. **18:** 254—1946

Acoustic impedance matching by means of screens. Frank H. Slaymaker and Mones E. Hawley. **20:** 594—1948

Electroacoustic phase shift in loudspeakers. C. A. Ewaskio. **20:** 597—1948

Facilities of the Altec Lansing Corporation for the measurement of loudspeaker performance. P. S. Veneklasen. **20:** 222—1948

Measurement of directivity factor. Cecil J. Burbank. **20:** 223—1948

Measurements for aiding in the evaluation of the quality of loudspeakers. H. H. Hall and H. C. Hardy. **20:** 596—1948

Monitor speaker. Walter W. Carruthers. **20:** 223—1948

Simple approach to generalized horn theory. O. K. El-Mawardi. **20:** 597—1948

Transient response of loudspeakers. H. C. Hardy and H. H. Hall. **20:** 596—1948

SUBTITLES

Inhomogeneity of the magnetic field of a dynamic loudspeaker. W. Reinhard. **11:** 261—1939

Phase and delay characteristic of metal diaphragm direct radiator loudspeaker. Francis M. Wiener. **13:** 122—1941

Design of crystal vibrating systems. William J. Fry, John M. Taylor, and Bertha W. Henvis. **18:** 229—1946 B.R.

Reciprocality in transducers. Horace M. Trent. **19:** 502—1947 L.E.

Self-reciprocity calibration of electroacoustic transducers. Edwin L. Carstensen. **19:** 702—1947 L.E.

5. APPLIED ACOUSTICS. INSTRUMENTS AND APPARATUS
5.9 Microphones, Vibration Microphones and Microphone Calibration Equipment

5.9 Microphones, Vibration Microphones, and Microphone Calibration Equipment (see also 13.11t)

PAPERS

Application of piezoelectric vibration pick-ups to measurement of acceleration, velocity and displacement. Benjamin Baumzweiger. **11:** 303—1940

Graphical determination of the random efficiency of microphones. Benjamin Baumzweiger. **11:** 477—1940

Microphone efficiency: Discussion and proposed definition. Frank Massa. **11:** 222—1939

Review of cardioid type unidirectional microphones. Ralph P. Glover. **11:** 296—1940

Sound source for investigating microphone distortion. William D. Phelps. **11:** 219—1939

Absolute measurement of sound without a primary standard. W. R. MacLean. **12:** 140—1940

Absolute noise level of microphones. Definition proposed for discussion. H. G. Baerwald. **12:** 131—1940

Absolute pressure calibration of microphones. Richard K. Cook. **12:** 415—1941

New microphone providing uniform directivity over an extended frequency range. R. N. Marshall and W. R. Harry. **12:** 481—1941

Properties of linear systems used in vibration measuring instruments. John D. Trimmer. **12:** 127—1940

Shock waves in air and characteristics of instruments for their measurement. L. Thompson. **12:** 198—1940

Analyzer for sub-audible frequencies. H. H. Scott. **13:** 360—1942

General purpose vibration meter. H. H. Scott. **13:** 46—1941

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Uniphase unidirectional microphones. Benjamin B. Bauer. **13:** 41—1941

Absolute pressure generator and its application to the free-field calibration of a microphone. W. Jay Kennedy and C. P. Boner. **14:** 19—1942

Acoustic laboratory in the new RCA laboratories. Harry F. Olson. **15:** 96—1943

Dipole microphone. Benjamin Olney, Frank H. Slaymaker, and Willard F. Meeker. **16:** 172—1945

Demountable soundproof rooms. W. S. Gorton. **17:** 236—1946

General theory of passive linear electroacoustic transducers and the electroacoustic reciprocity theorem. I. Leslie L. Foldy and Henry Primakoff. **17:** 109—1945

Gradient microphones. Harry F. Olson. **17:** 192—1946

Investigation of resonances in filaments by mechanical actuation and measurement of electromagnetically induced voltages. R. W. Carlisle and H. W. Koren. **17:** 71—1945

Working standard for sound pressure measurements. Frank Massa. **17:** 29—1945

Design and construction of anechoic sound chambers. Leo L. Beranek and Harvey P. Sleeper, Jr. **18:** 140—1946

Motional impedance analysis applied to a dynamic microphone. J. E. White. **18:** 155—1946

On the absolute pressure calibration of condenser microphones by the reciprocity method. A. L. DiMattia and F. M. Wiener. **18:** 341—1946

Ultrasonic condenser microphone. Theodore H. Bonn. **18:** 496—1946

Violation of the reciprocity theorem in linear passive electromechanical systems. Edwin M. McMillan. **18:** 344—1946

Acoustical impedance of enclosures. Fred B. Daniels. **19:** 569—1947

Cones as underwater transducer reflectors. Roland E. Mueser. **19:** 952—1947

Coordinates and the reciprocity theorem in electromechanical systems. John W. Miles. **19:** 910—1947

Further remarks on reciprocity. Edwin M. McMillan. **19:** 922—1947

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Magnetic throat microphones of high sensitivity. Daniel W. Martin. **19:** 43—1947

Measurement conditions influencing the front-to-back discrimination of an underwater hydrophone. Laymon N. Miller **19:** 59—1947

Measurement of electromotive force of a microphone. Richard K. Cook. **19:** 503—1947

Mechano-electronic transducers. Harry F. Olson. **19:** 307—1947

Performance of the anechoic room of the Parmly Sound Laboratory. H. C. Hardy, F. G. Tyzzer, and H. H. Hall. **19:** 992—1947

Two parabolic reflector underwater transducers. J. R. Reitz and R. E. Mueser. **19:** 35—1947

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Acoustic impedance matching by means of screens. Frank H. Slaymaker and Mones E. Hawley. **20:** 802—1948

Electromechanical feedback. Jan de Boer and Gerrit Schenkel. **20:** 641—1948

Reciprocity calibration of primary vibration standards. Sanford P. Thompson. **20:** 637—1948

Reciprocity calibration of vibration probes. Charles T. Morrow. **20:** 826—1948

Reciprocity free field calibration of microphones to 100 kc in air. I. Rudnick and M. N. Stein. **20:** 818—1948

Sound pressure measurement equipment for the range 50 cycles to 250 kc. Frank Massa. **20:** 451—1948

Vibrators for measurement of response and compliance of phonograph pick-ups. H. A. Pearson, R. W. Carlisle, and H. Cravis. **20:** 830—1948

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5. APPLIED ACOUSTICS. INSTRUMENTS AND APPARATUS

5.9 Microphones, Vibration Microphones, and Microphone Calibration Equipment (continued)

5.9 Microphones, Vibration Microphones, and Microphone Calibration Equipment (continued)

New microphone providing uniform directivity over an extended frequency range. R. N. Marshall and W. R. Harry. **11:** 164—1939

Parabolic sound concentrator. R. C. Coile. **11:** 167—1939

Review of cardioid type unidirectional microphones. Ralph P. Glover. **11:** 379—1940

Sound source for investigating microphone distortion. W. D. Phelps. **11:** 164—1939

Absolute calibration of microphones. Richard K. Cook. **12:** 462—1941

Absolute noise level of microphones—a definition proposed for discussion. H. G. Baerwald. **12:** 461—1941

Absolute sound pressure measurements with tourmaline. L. J. Sivian. **12:** 462—1941

Acoustic wattmeter, an instrument for measuring sound energy flow. C. W. Clapp and F. A. Firestone. **12:** 473—1941

Comparison between piezoelectric and electromagnetic coupling. Karl S. Van Dyke. **12:** 461—1941

Ultramicrometer as a vibration meter. J. C. Hubbard and Philip Hambleton. **12:** 468—1941

Uniphase uni-directional microphones. Benjamin B. Bauer. **12:** 473—1941

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General purpose vibration meter. H. H. Scott. **13:** 82—1941

Phase distortion in electroacoustical systems. Francis M. Wiener. **13:** 81—1941

Acoustic laboratory in the new RCA laboratories. Harry F. Olson. **15:** 80—1943

New frequency selective vibrometer. Earle L. Kent. **15:** 79—1943

Design of non-reverberant rooms for acoustic measurements. Leo L. Beranek. **16:** 98—1944

Dipole microphone. Benjamin Olney, Frank H. Slaymaker and Willard F. Meeker. **16:** 102—1944

Absolute calibration of condenser microphones by the reciprocity method. A review. Francis M. Wiener. **17:** 102—1945

Acoustic pulse testing. E. F. Shrader. **17:** 101—1945

Anti-noise characteristics of differential microphones. H. E. Ellithorn and A. M. Wiggins. **17:** 104—1945

Detection of resonances in vibratile members by measurement of electro-magnetically induced voltages. R. W. Carlisle and H. W. Koren. **17:** 101—1945

General proof of the reciprocity theorem for electroacoustic transducers. Leslie L. Foldy and Henry Primakoff. **17:** 102—1945

Working standard for sound pressure measurements. Frank Massa. **17:** 102—1945

Design of anechoic sound chambers. Leo L. Beranek and H. P. Sleeper, Jr. **18:** 246—1946

Discrimination of transducers against reverberation. T. H. Schafer. **18:** 254—1946

Magnetic throat microphones of high sensitivity. Daniel W. Martin. **18:** 253—1946

Motional impedance anylsis applied to a dynamic microphone. J. E. White. **18:** 253—1946

Transient analysis of linear systems, using underwater explosion waves. M. F. M. Osborne and J. L. Carter. **18:** 252—1946

Construction and design of Parmly Sound Laboratory and anechoic chamber. Peter J. Mills. **19:** 737—1947

Electroacoustic reciprocity theorem. R. J. Kennedy. **19:** 291—1947

Measurement conditions influencing the front-back discrimination of an underwater hydrophone. Laymon N. Miller. **19:** 284—1947

Mechano-electronic transducer. Harry F. Olson. **19:** 291—1947

Performance of the anechoic room in the Parmly Laboratory. H. C. Hardy, F. G. Tyzzer, and H. H. Hall. **19:** 737—1947

Acoustic impedance matching by means of screens. Frank H. Slaymaker and Mones E. Hawley. **20:** 594—1948

Free field calibration of transducers to 100 kc in air. I. Rudnick and M. N. Stein. **20:** 224—1948

Measurement of directivity factor. Cecil J. Burbank. **20:** 223—1948

New instrument for subsonic frequency measurements. J. V. Atanasoff, B. L. Snavely, and John Brown. **20:** 222—1948

Reciprocity calibration of primary vibration standards. Sanford P. Thompson. **20:** 596—1948

Reciprocity calibration of vibration probes. Charles T. Morrow. **20:** 598—1948

Small high frequency microphone. I. Rudnick and H. C. Rothenberg. **20:** 594—1948

Sound pressure measurement equipment for the range 50 cycles to 250 kc. Frank Massa. **20:** 591—1948

SUBTITLES

Absolute calibration of microphones. W. Ernsthausen. (Akustische Zeits. **4,** 13 (1939)). **11:** 153—1939

Frequency characteristic crystal vibration pick-up. Benjamin Baumzweiger. **11:** 305—1940

Harmonic distortion in an RCA-44A microphone. William D. Phelps. **11:** 221—1939

Random energy response. Ralph P. Glover. **11:** 301—1940

Vibration pick-up calibration. Benjamin Baumzweiger. **11:** 304—1940

Capacity of crystal microphones as a function of temperature. Paul Huber and John M. Whitmore. **12:** 170—1940

Indication of sound level meter due to the magnetic pick-up of dynamic microphone in a field of 1 gauss, r.m.s. Paul Huber and John M. Whitmore. **12:** 170—1940

Open circuit output of a dynamic microphone as a function of temperature. Paul Huber and John M. Whitmore. **12:** 170—1940

Tourmaline microphone. Richard K. Cook. **12:** 415—1941

Phase distortion in microphones. Francis M. Wiener. **13:** 115—1941

Pressure calibration of miniature condenser microphones W. E. D96436 and W. E. 640. Francis M. Wiener. **13:** 117—1941

5. APPLIED ACOUSTICS. INSTRUMENTS AND APPARATUS

5.9 Microphones, Vibration Microphones, and Microphone Calibration Equipment (continued)
5.10 Navigational Instruments. Using Air Sound. Altitude Measuring Instruments. Sound Ranging. Geophysical Prospecting
5.11 Oscillators, Electrical and Mechanical
5.12 Phase Meters
5.13 Public Address Systems and Sound Picture Installations
5.14 Rayleigh Disks
5.15 Sound Level Meters. Level Recorders. Sound Pressure Measurement

5.9 Microphones, Vibration Microphones, and Microphone Calibration Equipment (continued)

Reciprocity calibration of miniature condenser microphone in free space. Francis M. Wiener. **13:** 119—1941

Design of crystal vibrating systems. William J. Fry, John M. Taylor, and Bertha W. Henvis, **18:** 229—1946 B.R.

Area factor in microphone (S/N) ratio. Daniel W. Martin. **19:** 254—1947 L.E.

Real-voice response characteristics of carbon, ANB-M-C1, and magnetic MC-253-A, microphones in an oxygen mask, A-14, at sea level and high altitude. **19:** 120—1947

Reciprocality in transducers. Horace M. Trent. **19:** 502—1947 L.E.

Self-reciprocity calibration of electroacoustic transducers. Edwin L. Carstensen. **19:** 702—1947

Violation of the reciprocity theorem in linear passive electromechanical systems. H. Jefferson. **19:** 502—1947 L.E.

Phase characteristics of condenser microphones. Francis M. Wiener. **20:** 707—1948 L.E.

Remarks on measurement of electromotive force of a microphone. Richard K. Cook. **20:** 874—1948 L.E.

Substitution method for calibrating a microphone. G. B. Madella. **20:** 550—1948 L.E.

5.10 Navigational Instruments. Using Air Sound. Altitude Measuring Instruments. Sound Ranging. Geophysical Prospecting

PAPER

Underwater sound of natural origin. E. O. Hulburt. **14:** 173—1943

ABSTRACTS

Some acoustical phenomena in the Antarctic. Thomas C. Poulter. **12:** 474—1941

Sono radio buoys. Herbert Grove Dorsey. **12:** 466—1941

Application of acoustical methods to mining problems. Leonard Obert. **16:** 100—1944

5.11 Oscillators, Electrical and Mechanical

ABSTRACTS

Audiofrequency harmonic generator system. R. H. Frick and P. S. Veneklasen. **11:** 166—1939

Method for changing the frequency of a complex wave. E. L. Kent. **14:** 128—1942

SUBTITLE

Stable oscillator. O. J. Murphy. **12:** 396—1941

5.12 Phase Meters

PAPER

Standard lag line for phase measurement. O. Hugo Schuck. **20:** 26—1948

ABSTRACTS

Standard lag line for phase measurement. O. H. Schuck. **19:** 736—1947

The type 310-A-Z-angle meter, a new instrument for electrical electroacoustic measurements. L. E. Packard. **19:** 736—1947

"Phangle" meter. Edith L. R. Corliss. **20:** 584—1948

5.13 Public Address Systems and Sound Picture Installations

PAPERS

Sound in the theater. Harold Burris-Meyer. **11:** 356—1940

Control of acoustic conditions on the concert stage. Harold Burris-Meyer. **12:** 335—1941

Sound control apparatus for the theater. Harold Burris-Meyer. **12:** 122—1940

SUBTITLES

Offstage loudspeaker as aid to singer. Harold Burris-Meyer. **12-** 335—1941

"Higher fidelity" in sound transmission and reproduction. George M. Nixon. **17:** 132—1945

Identification of musical instruments when heard directly and over a public-address system. Halson V. Eagleson and Oran W. Eagleson. **19:** 338—1947

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Sound in the theater. Harold Burris-Meyer. **11:** 374(T), 380—1940

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Basic measurements on the physical characteristics of speech transmission systems. L. L. Beranek. **17:** 101—1945

Identification of musical instruments when heard directly and over a public-address system. Halson V. Eagleson. **19:** 291—1947

5.14 Rayleigh Disks

PAPERS

Sound pressure on spheres. Francis E. Fox. **12:** 147—1940

Rayleigh disk as a laboratory instrument. H. Hewell Roseberry and W. Conley Smith. **16:** 123—1944

5.15 Sound Level Meters. Level Recorders. Sound Pressure Measurement (see also 5.4)

PAPERS

Degenerative sound analyzer. H. H. Scott. **11:** 225—1939

Loudness level to loudness conversion chart. Paul H. Geiger. **11:** 308—1940

5. APPLIED ACOUSTICS. INSTRUMENTS AND APPARATUS

5.15 Sound Level Meters. Level Recorders. Sound Pressure Measurement (continued)

5.16 Sound Recording and Reproducing. General

5.15 Sound Level Meters. Level Recorders. Sound Pressure Measurement (continued)

Sound level meter performance. J. E. Tweeddale. **12:** 421—1941

Sound level meters from the user's viewpoint. Paul Huber and John M. Whitmore. **12:** 167—1940

Sound measurement objectives and sound level meter performance. J. M. Barstow. **12:** 150—1940

Variation of sound level meter sensitivity with applied voltage. Paul Huber and John M. Whitmore. **12:** 169—1940

Acoustic wattmeter, an instrument for measuring sound energy flow. C. W. Clapp and F. A. Firestone. **13:** 124—1941

General purpose vibration meter. H. H. Scott. **13:** 46—1941

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Sound pressure measurement equipment for the range 50 cycles to 250 kc. Frank Massa. **20:** 451—1948

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Portrayal of visible speech. J. C. Steinberg and N. R. French. **18:** 244—1946

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5.16 Sound Recording and Reproducing. General (see also 5.13)

PAPERS

Notes on phonograph pick-ups for lateral-cut records. Lawrence Fleming. **12:** 366—1941

Theory of tracing distortion in sound reproduction from phonograph records. W. D. Lewis and F. V. Hunt. **12:** 348—1941

Tone guard. Harry F. Olson. **12:** 374—1941

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5. APPLIED ACOUSTICS. INSTRUMENTS AND APPARATUS
5.16 Sound Recording and Reproducing. General (continued)

5.16 Sound Recording and Reproducing. General (continued)

Mechanical and optical equipment for the stereophonic sound film system. E. C. Wente, R. Biddulph, L. A. Elmer and A. B. Anderson. **13:** 100—1941

Noise and wear reducing phonograph reproducer with controlled response. F. H. Goldsmith. **13:** 281—1942

Properties of the dulled lacquer cutting stylus. C. J. LeBel. **13:** 265—1942

Stereophonic sound film system—general theory. Harvey Fletcher. **13:** 89—1941

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Tracing distortion in the reproduction of constant amplitude recordings. Ludwig W. Sepmeyer. **13:** 276—1942

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Measurement of recording characteristics by means of light patterns. B. B. Bauer. **18:** 387—1946

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Erratum: Measurement of recording characteristics by means of light patterns. B. B. Bauer. **19:** 255—1947

Frequency range preference for speech and music. Harry F. Olson. **19:** 549—1947

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Tone guard. Harry F. Olson. **12:** 474—1941

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Errors in light band width measurements on phonograph records. Richard Bierl (Akustische Zeits. **5**, 145–147 (1940).) **13:** 190—1941

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High fidelity from the musician's viewpoint. Ernest La Prade. **13:** 331—1942

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Distortions peculiar to sound recording on motion picture film. R. Paul Ireland. **19:** 288—1947

5. APPLIED ACOUSTICS. INSTRUMENTS AND APPARATUS

5.16 Sound Recording and Reproducing. General (continued)
5.16d Disk Recording (including cutting and embossing)
5.16m Magnetic Recording
5.17 Telephone. Telephone Receivers
5.18 Thermophones
5.20 Tone and Wave Synthesizers
5.21 Vibration Devices. Devices for Generating or Damping Vibrations

5.16 Sound Recording and Reproducing. General (continued)

Design problems on magnetic recording equipment. S. J. Begun. **19:** 289—1947

Disk recording studio acoustics. J. Y. Dunbar and Lonsdale Green, Jr. **19:** 287—1947

Frequency range preference for speech and music. Harry F. Olson. **19:** 731—1947

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Soliloquy on wire recorder wow. Arthur W. Sear. **19:** 289—1947

Some factors influencing the choice of a medium for magnetic recording. Lynn C. Holmes. **19** 288—1947

Some physical aspects of magnetic recording. Otto Kornei. **19:** 289—1947

System for reducing scratch in record reproduction. Richard W. Carlisle. **19:** 288—1947

Wow meter. W. W. Hansen. **19:** 289—1947

Audio noise reduction system. Harry F. Olson. **20:** 222—1948

SUBTITLES

Notes on sound recording. H. J. Hasbrouck. **11:** 382—1940

Electric phonograph pick-up. **19:** 315—1947

5.16d Disk Recording (including cutting and embossing)

PAPERS

Sincle shear plate crystal phonograph pick-up. A. N. Wiggins and F. S. Lewis. **20:** 448—1948

Vibrators for measurement of response and compliance of phonograph pick-ups. H. A. Pearson, R. W. Carlisle, and H. Cravis. **20:** 830—1948

ABSTRACTS

Calibration of phonograph reproducers. Weiant Wathen-Dunn. **20:** 584—1948

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5.16m Magnetic Recording

ABSTRACTS

Discussion of some of the factors which determine the effective noise level in magnetic recording. J. Warren Gratian. **20:** 584—1948

Distortion in magnetic recording. Walter H. Erikson. **20:** 584—1948

5.17 Telephone. Telephone Receivers

PAPERS

Remaking speech. Homer Dudley. **11:** 169—1939

Room noise at subscribers' telephone locations. D. F. Seacord. **12:** 183—1940

Room noise spectra at subscribers' telephone locations. Daniel F. Hoth. **12:** 499—1941

Improved telephone receiver analysis. R. D. Fay. **15:** 32—1943

Development of midget earphones for military use. H. A. Pearson, A. B. Mundel, R. W. Carlisle, W. F. Knauert, and M. E. Zaret. **18:** 348—1946

Training for voice communication. John W. Black and Harry M. Mason. **18:** 441—1946

Construction and calibration of an improved bone-conduction receiver for audiometry. R. W. Carlisle, H. A. Pearson, and P. R. Werner. **19:** 632—1947

Headphone measurements and their interpretation. Daniel W. Martin and Leslie J. Anderson. **19:** 63—1947

Physiological noise generated under earphone cushions. W. J. Brogden and George A. Miller. **19:** 620—1947

ABSTRACT

Remaking speech. Homer Dudley. **11:** 165—1939; 373(T)—1940

Room noise spectra at subscribers' telephone locations. D. F. Hoth. **12:** 475—1941

Basic measurements on the physical characteristics of speech transmission systems. L. L. Beranek. **17:** 101—1945

Headphone measurements and their interpretation. Daniel W. Martin and Leslie J. Anderson. **17:** 101—1945

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Magnitude of the physiological noise generated under earphone cushions. W. J. Brogden and G. A. Miller. **19:** 734—1947

Modern version of the old theory of telephone quality. Harvey Fletcher. **19:** 291—1947

SUBTITLE

Effects of artificial leaks at altitude and sea level. **20:** 768—1948

5.18 Thermophones (see also 5.9)

PAPER

Thermophone as a souce of sound in liquid helium and liquid hydrogen. Henry A. Fairbank, William N. Fairbank, and C. T. Lane. **19:** 475—1947

5.20 Tone and Wave Synthesizers

ABSTRACT

Hundred-element tone synthesizer. E. C. Wente, C. A. Lovell, and J. F. Muller. **18:** 253—1946

5.21 Vibration Devices. Devices for Generating or Damping Vibrations (see also 5.9)

PAPER

The measuring of impact sound transmission through floors. Fritz Ingerslev, A. Kjerbye Nielsen, and S. Falck Larsen. **19:** 981—1947

6. MUSICAL INSTRUMENTS AND MUSIC
6.1 General, Unclassified

6. Musical Instruments and Music

6.1 General, Unclassified

PAPERS

Artificial larynx for speaking and choral singing by one person. F. A. Firestone. **11:** 357—1940

Design for a keyboard instrument in just intonation. Charles Williamson. **11:** 216—1939

Note on just intonation. Llewelyn S. Lloyd. **11:** 440—1940

Suggestion for simplified musical notation. Preston Edwards. **11:** 323—1940

Terminology for logarithmic frequency units. Robert W. Young. **11:** 134—1939

Control of acoustic conditions on the concert stage. Harold Burris-Meyer. **12:** 335—1941

Further applications of our direct-reading pitch and intensity recorder. Juichi Obata and Ryûji Kobayashi. **12:** 188—1940

Masking effects in practical instrumentation and orchestration. Abe Pepinsky. **12:** 405—1941

Measurements of orchestral pitch. O. J. Murphy. **12:** 395—1941

Note on just intonation. Correction. Llewelyn S. Lloyd. **12:** 206—1940

Trends in acceptable tone quality as evidenced in modern musical instruments. Abe Pepinsky. **12:** 403—1941

Musical theory in retrospect. Llewelyn S. Lloyd. **13:** 56—1941

Acoustics of music. Wilmer T. Bartholomew. **14:** 114—1942

Attitudes toward types of industrial music. W. A. Kerr. **15:** 125—1943

Growing appreciation of music and its effect upon the choice of music in industry. Abe Pepinsky. **15:** 176—1944

Industrial music and morale. Dan D. Halpin. **15:** 116—1943

Mean-tone temperament. The classical system of instrumental tuning. William Braid White. **15:** 12—1943

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Programming music for industry. Ben Selvin. **15:** 131—1943

Statistical method in determining the effects of music in industry. R. L. Cardinell. **15:** 133—1943

Some problems for postwar musical acoustics. Robert W. Young. **16:** 103—1944

Musicology, the stepchild of the sciences. Abe Pepinsky. **17:** 83—1945

Place of music in healing. Harold Burris-Meyer and Richmond L. Cardinell. **17:** 232—1946

Toward a theory of intervals. Demar B. Irvine. **17:** 350—1946

Letter to the editor. Charles Williamson. **17:** 86—1945

Analyses of the tones of a few wind instruments. F. A. Saunders. **18:** 395—1946

Just scale for music. Arthur Taber Jones. **18:** 167—1946

ABSTRACTS

Incremental musical scales. M. H. Gwynn. **18:** 248—1946

Identification of musical instruments when heard directly and over a public-address system. Halson V. Eagleson and Oran W. Eagleson. **19:** 338—1947

Institute of musical science—a suggestion. Harvey Fletcher. **19:** 527—1947

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Musical tone qualities as a factor in expressiveness. Abe Pepinsky. **19:** 542—1947

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Place of acoustics in the future of music. Harold Burris-Meyer. **19:** 532—1947

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Mexican musician makes musical tests at New York University. **20:** 553—1948

Table relating frequency to cents. Robert W. Young. Book. **11:** 255—1939

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Physics of music. Alexander Wood. **16:** 129—1944

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6. MUSICAL INSTRUMENTS AND MUSIC

6.1 General, Unclassified (continued)
6.2 Bells, Xylophones. Other Instruments Having Rigid Vibrators
6.3 Brass Wind Instruments

6.1 General, Unclassified (continued)

Comparison and demonstration of two systems of intonation of keyboard instruments. W. B. White. **19:** 727—1947

Division of the octave. Elwood S. Roeder. **19:** 727—1947

Dynamic tone envelope of harmonic components of musical sounds. J. M. Schmidt. **19:** 724—1947

Identification of musical instruments when heard directly and over a public-address system. Halson V. Eagleson and Oran W. Eagleson. **19:** 291—1947

Imagery in describing tone quality. Vincent Salmon. **19:** 731—1947

Institute of musical science—a suggestion. Harvey Fletcher **19:** 722—1947

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Slide rule for the study of music and musical acoustics. L. E. Waddington. **19:** 727—1947

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Therapeutic and industrial uses of music, a review of the literature. Doris Soibelman. **20:** 881—1948 B.R.

Wanted—The formant—Dead or alive. R. H. Bolt. **20:** 66—1948 L.E.

6.2 Bells, Xylophones. Other Instruments Having Rigid Vibrators

PAPERS

Sound of bells. Jottings from my experiences with the sound of bells. Strike note. Jan Arts. **11:** 321—1940

"Bells." Jan Arts. **11:** 485(L)—1940

Some experiments on an elephant bell. H. D. Brailsford. **15:** 180—1944

Jottings from my experiences with the sound of bells. Jan Arts. **17:** 231—1946

SUBTITLES

Effect of heating and cooling on the pitch of bells. Jan Arts. **18:** 503—1946 L.E.

Campanology, Europe 1945–47. Percival Price. **20:** 710—1948 B.R.

6.3 Brass Wind Instruments

PAPERS

Directivity and the acoustic spectra of brass wind instruments. Daniel W. Martin. **13:** 309—1942

Lip vibrations in a cornet mouthpiece. Daniel W. Martin. **13:** 305—1942

Resonance characteristics of a cornet. J. G. Woodward. **13:** 156—1941

Vibration of the walls of a cornet. H. P. Knauss and W. J. Yeager. **13:** 160—1941

Experimental study of trumpet embouchure. Hayward W. Henderson. **14:** 58—1942

Dependence of tuning of wind instruments on temperature. Robert W. Young. **17:** 187—1946

Analyses of the tones of a few wind instruments. F. A. Saunders. **18:** 395—1946

Electrical method of measuring the intonation of cup mouthpiece instruments. John C. Webster. **19:** 902—1947

Performance of cup-mouthpiece instruments. T. H. Long. **19:** 892—1947

On the performance of cup mouthpiece instruments. T. H. Long. **20:** 875—1948 L.E.

On the performance of cup mouthpiece instruments. Robert W. Young. **20:** 345—1948 L.E.

ABSTRACTS

Experiments in the analysis of a mechanically produced cornet tone. Daniel W. Martin. **12:** 476—1941

Mechanical playing device for brass wind instruments. Daniel W. Martin. **12:** 467—1941

Directivity and the acoustic spectra of brass wind instruments. Daniel W. Martin. **13:** 333—1942

Lip vibrations in a cornet mouthpiece. Daniel W. Martin. **13:** 80—1941

Some characteristics of the tuning of valved wind instruments. Robert W. Young. **13:** 333—1942

Experimental study of trumpet embouchure. Haward W. Henderson. **14:** 127—1942

Analysis of tones of wind instruments and of resonating strings. F. A. Saunders. **16:** 101—1944

Electrical method for measuring the intonation of cup mouthpiece instruments. John C. Webster. **19:** 723—1947

6. MUSICAL INSTRUMENTS AND MUSIC

6.3 Brass Wind Instruments (continued)
6.5 Pipe Organs
6.6 Pianos and Other Keyboard Stringed Instruments
6.7 Violin Family. Stringed Instruments except Keyboard Type

6.3 Brass Wind Instruments (continued)

Performance of cup-mouthpiece instruments. T. H. Long. **19:** 723—1947

Trumpet intonation differences due to bell taper. John C. Webster. **20:** 588—1948

SUBTITLES

Sound pressure *vs.* azimuth angle for cornet. Daniel W. Martin. **13:** 310—1942

Sound pressure *vs.* azimuth angle for French horn. Daniel W. Martin. **13:** 310—1942

6.5 Pipe Organs (see also 6.9)

PAPERS

Design for a keyboard instrument in just intonation. Chas. Williamson. **11:** 216—1939

Recent investigations of organ pipes. Arthur Taber Jones. **11:** 122—1939

Effect of wall materials on the steady-state acoustic spectrum of flue pipes. C. P. Boner and R. B. Newman. **12:** 83—1940

End corrections of organ pipes. Arthur Taber Jones. **12:** 387—1941

Problems in the analysis of the tone of an open organ pipe. Paul A. Northrop. **12:** 90—1940

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Initial transients or organ pipes. A. W. Nolle and C. P. Boner. **13:** 149—1941

Comparison between a Haskell organ pipe and a simple open pipe. R. C. Biner and A. S. Hall. **14:** 140—1942

Edge tones. Arthur Taber Jones. **14:** 131—1942

Keyboard instrument in just intonation. Chas. Williamson. **15:** 173—1944

ABSTRACTS

Experiments connected with end corrections for organ pipes. Arthur Taber Jones. **12:** 467—1941

Problems in the analysis of the tone of an open organ pipe. P. A. Northop. **12:** 467—1941

Some aspects of the transient and steady state tones of organ pipes and of vibrating strings. A. W. Nolle and C. P. Boner. **13:** 333—1942

Tone spectrum of a Silbermann organ. W. Lottermosser (Akustische Zeits. **5**, 324—330 (1940)). **13:** 189—1941

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Overblowing of organ pipes. C. P. Boner and R. B. Newman. **15:** 76—1943

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SUBTITLE

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SUBTITLES

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6.7 Violin Family. Stringed Instruments except Keyboard Type

PAPERS

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6. MUSICAL INSTRUMENTS AND MUSIC

6.7 Violin Family. Stringed Instruments except Keyboard Type (continued)
6.8 Wood Winds
6.9 Electrical Musical Instruments

6.7 Violin Family. Stringed Instruments except Keyboard Type (continued)

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SUBTITLE

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ABSTRACTS

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ABSTRACTS

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7. NOISE
7.1 General, Unclassified
7.3 Audiograms of Noise
7.4 City Noise
7.5 Frequency Analyses of Noise
7.6 Noise in Buildings

7. Noise

7.1 General, Unclassified (see also 5.15)

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ABSTRACT

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7. NOISE

7.6 Noise in Buildings (continued)
7.7 Machinery Noise, Mufflers, Noise Silencers

7.6 Noise in Buildings (continued)

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SUBTITLE

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7.7 Machinery Noise, Mufflers, Noise Silencers

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8.1 General, Unclassified

8. Standards

8.1 General, Unclassified

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9. SPEECH AND SINGING
9.1 General, Unclassified
9.2 Anatomy and Physiology of the Speech Organs

9. Speech and Singing

9.1 General, Unclassified

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9. SPEECH AND SINGING

9.3 Articulation Testing. Intelligibility. Defective Speech
9.4 Frequency of Occurrence of Speech Sounds
9.5 Frequency Analyses of Speech Sounds

9.3 Articulation Testing. Intelligibility. Defective Speech

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ABSTRACTS

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SUBTITLES

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Transmission and reception of sounds under combat conditions. G. A. Miller and F. M. Wiener. **20:** 880—1948 B.R.

9.4 Frequency of Occurrence of Speech Sounds

SUBTITLE

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9.5 Frequency Analyses of Speech Sounds

PAPERS

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9. SPEECH AND SINGING

9.5 Freq ency Analyses of Speech Sounds (continued)
9.6 Instruments Relating to Speech and Singing
9.7 Speech Pitch
9.8 Speech Power. Singing Voice Power
9.10 Phonetics

9.5 Frequency Analyses of Speech Sounds (continued)

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Diagram of improved artificial voice. **19:** 647—1947

9.7 Speech Pitch

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ABSTRACTS

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9.8 Speech Power. Singing Voice Power

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SUBTITLES

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Spectral distribution of peak acoustic powers in speech and symphony music. Keron C. Morrical. **11:** 212—1939

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Speech peak pressures on one-eighth-second intervals. H. K. Dunn and S. D. White. **11:** 278—1940

Starting characteristics of speech sounds. R. O. Drew and E. W. Kellogg. **12:** 95—1940

Quantitative amplitude representation in sound spectrograms. W. Koenig and A. E. Ruppel. **20:** 787—1948

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ABSTRACT

Statistical measurements on conversational speech. H. K. Dunn and S. D. White. **11:** 374—1940

Loudness of speaking: The effect of heard stimuli on spoken responses. John W. Black. **20:** 598—1948

9.10 Phonetics

PAPER

Basic phonetic principles of visible speech. G. A. Kopp and H. C. Green. **18:** 74—1946

ABSTRACTS

Basic phonetic principles of visible speech. G. A. Kopp and H. C. Green. **18:** 244—1946

Standard scale of speech sounds defined in radio. Claire Benedict. **18:** 249—1946

SUBTITLE

Classification and differentiation of speech sounds. **18:** 79—1946

10. ULTRASONICS (SUPERSONICS)
10.1 General, Unclassified
10.2 Light Affected by Ultrasonic Waves
10.3 Ultrasonic Instruments

10. Ultrasonics (Supersonics)

10.1 General, Unclassified

PAPERS

New aspect of ultrasonics. B. K. Sahay. **17:** 285—1946

Supersonic insects. W. H. Pielemeier. **17:** 337—1946

Wave-front determination in a unidirectional supersonic beam. L. W. Labaw. **17:** 19—1945

Interactions between a plate and a sound field. R. D. Fay. **20:** 620—1948

Reflection of sound from submerged plates. W. J. Finney. **20:** 626—1948

Some background history of ultrasonics. Elias Klein. **20:** 601—1948

Thickness-shear vibrations of thin anisotropic plates. Gunnar Hok. **20:** 406—1948

ABSTRACTS

Supersonics: science of inaudible sounds. R. W. Wood. Book. **11:** 256—1939

Ultrasonics and their scientific and technical applications. Ludwig Bergmann. Book. **11:** 255—1939

Ultrasonic study of phase transition near the critical point. J. C. Hubbard and C. M. Herget. **12:** 467—1941

Grundlagen und Ergebnisse der Ultraschallforschung. Egon Hiedemann (book review). **13:** 321—1942

Some properties of ultrasonic fields. Frank H. Slaymaker, Harry D. Polster, and Willard F. Meeker. **19:** 732—1947

Some background history of ultrasonics. Elias Klein. **20:** 599—1948

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SUBTITLES

Supersonic phenomena. William T. Richards. **11:** 262—1939

Der Ultraschall und Seine Anwendung in Wissenschaft und Technik, Ludwig Bergmann, **18:** 507—1946 B.R.

Thickness-shear vibrations of thin AT and BT cut quartz plates. **20:** 415—1948

10.2 Light Affected by Ultrasonic Waves

PAPER

Ultrasonics and elasticity. H. F. Ludloff. **12:** 193—1940

SUBTITLE

Ultrasonic cells and light modulation. R. H. Bolt and A. Giacomini. **20:** 330—1948

10.3 Ultrasonic Instruments

PAPERS

Curved quartz crystals as supersonic generators. L. W. Labaw. **16:** 237—1945

Measurement of supersonic absorption in water by the balance method with mechanical integration. Eugene Tsung-Yueh Hsu. **17:** 127—1945

Supersonic reflectoscope, an instrument for inspecting the interior of solid parts by means of sound waves. Floyd A. Firestone. **17:** 287—1946

Refinements in supersonic reflectoscopy. Polarized sound. Floyd A. Firestone and Julian R. Frederick. **18:** 200—1946

Standing wave technique of thickness measurements. John B. Butler and James B. Vernon. **18:** 212—1946

Ultrasonic condenser microphone. Theodore H. Bonn. **18:** 496—1946

Detection of internal leaks in aircraft hydraulic systems. Richard G. Nuckolls and Horace M. Trent. **19:** 364—1947

High intensity ultrasonics: the power output of a piezoelectric quartz crystal. Leo F. Epstein, Walther M. A. Andersen, and Lewis R. Harden. **19:** 248—1947

Measurement and specification of ultrasonic lenses. Paul J. Ernst. **19:** 474—1947

Precision ultrasonic interferometer for liquids and some velocities in heavy water. D. R. McMillan, Jr., and R. T. Lagemann. **19:** 956—1947

Ultrasonic measurement of wall thickness in Diesel cylinder liners. Francis W. Struthers and Horace M. Trent. **19:** 368—1947

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Lamination designs for magnetostrictive underwater electroacoustic transducers. Leon Camp. **20:** 616—1948

Reciprocity free field calibration of microphones to 100 kc in air. I. Rudnick and M. N. Stein. **20:** 818—1948

Some background history of ultrasonics. Elias Klein. **20:** 601—1948

Ultrasonic solid delay lines. David L. Arenberg. **20:** 1—1948

ABSTRACTS

Curved quartz crystals as supersonic generators. L. W. Labaw. **16:** 100—1944

Fixed path supersonic interferometer for liquids. J. W. Ballou and J. C. Hubbard. **16:** 100—1944

Supersonic interferometer as an industrial tool for the study of liquids and solids. Elias Klein and J. W. Fitzgerald. **16:** 100—1944

Supersonic reflectoscope; an instrument for inspecting the interior of metal parts by means of sound waves. F. A. Firestone and J. R. Frederick. **16:** 100—1944

Refinements in supersonic reflectoscopy. Floyd A. Firestone and Julian R. Frederick. **18:** 253—1946

Detection of internal leaks in aircraft hydraulic systems. Richard G. Nuckolls and Horace M. Trent. **19:** 284—1947

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Supersonic radar trainers. Charles E. Teeter, Jr. **19:** 286—1947

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10. ULTRASONICS (SUPERSONICS)
10.3 Ultrasonic Instruments (continued)
10.4 Gases, Ultrasonic Velocities, Dispersion, and Absorption
10.5 Liquids, Ultrasonic Velocities, Dispersion, and Absorption

10.3 Ultrasonic Instruments (continued)

Ultrasonic lenses and transmission plates. Paul J. Ernst. **19:** 285—1947

Crystal pick-up for the detection of ultrasonic standing waves in rods. A. E. Bakanowski and R. B. Lindsay. **20:** 590—1948

Radiation characteristics of ultrasonic focusing radiators G. W. Willard. **20:** 589—1948

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Ultrasonic materials tester. H. E. Van Valkenburg. **20:** 590—1948

Ultrasonic radiation from curved quartz crystals. Louis Fein. **20:** 583—1948

SUBTITLES

Mechanical breakdown of a quartz crystal in oil. **19:** 253—1947

Piezoelectricity. Walter Guyton Cady. **19:** 261—1947 B.R.

Quartz family minerals. H. C. Dake, Frank L. Fleener, and Ben Hur Wilson. **19:** 262—1947 B.R.

Crystal studies. R. H. Bolt and A. Giacomini. **20:** 331—1948

Operating constants for liquid and quartz delay lines. David L. Arenberg. **20:** 3—1948

Transducer band width ratio at half-power points as a function of Z_0/Z_1. David L. Arenberg. **20:** 2—1948

10.4 Gases, Ultrasonic Velocities, Dispersion, and Absorption (see also 11.3)

PAPERS

Supersonic dispersion in vapors. William Railston. **11:** 107—1939

Absorption of sound in carbon dioxide. Robert W. Leonard **12:** 241—1940

Absorption of sound in CO_2, N_2O, COS, and in CS_2, containing added impurities. V. O. Knudsen and E. Fricke. **12:** 255—1940. Errata. **12:** 449—1941

Absorption of sound in five triatomic gases. Edwin F. Fricke. **12:** 245—1940

Temperature and frequency effects on ultrasonic velocities in carbon dioxide. C. J. Overbeck and H. C. Kendall. **13:** 26—1941

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Supersonic measurements in CO_2 and H_2O at 98° C. W. H. Pielemeier and W. H. Byers. **15:** 17—1943

Supersonic measurements in CO_2 at 0° to 100° C. W. H. Pielemeier. **15:** 22—1943

Use of the Pierce interferometer for measuring the absorption of sound in gases. Howard C. Hardy. **15:** 91—1943

Kneser's sound absorption nomogram and other charts. W. H. Pielemeier. **16:** 273—1945

Velocity of sound in vapors. K. Matta and M. Mokhtar. **16:** 120—1944

Observed classical sound absorption in air. W. H. Pielemeier. **17:** 24—1945

Wave-front determination in a unidirectional supersonic beam. L. W. Labaw. **17:** 19—1945

High frequency absorption in air and other gases. L. J. Sivian. **19:** 914—1947

Ultrasonic propagation in open air. H. K. Schilling, M. P. Givens, W. L. Nyborg, W. A. Pielemeier, and H. A. Thorpe. **19:** 222—1947

ABSTRACTS

Absorption of sound in CO_2, N_2O, COS, and in CS_2 containing added impurities. V. O. Knudsen and E. Fricke. **12:** 466—1941

Effects of water vapor on supersonic dispersion in CO_2. D. Telfair. **12:** 466—1941

Improved apparatus for the direct measurement of the absorption of sound in gases. Robert W. Leonard. **12:** 466—1941

Correlations between ultrasonic and micrometeorological phenomena. Carl E. Drumheller, Harold K. Schilling, and Howard A. Thorpe. **18:** 246—1946

On fluctuations of ultrasonic intensities outdoors. H. K. Schilling, W. L. Nyborg, and H. A. Thorpe. **19:** 286—1947

Velocity of sound in superheated steam. James Woodburn. **19:** 287—1947

Preliminary report on absorption in air from 10 to 100 kc, measured by pulse techniques. H. C. Rothenberg and W. H. Pielemeier. **20:** 585—1948

Rotational absorption and dispersion of ultrasonics in hydrogen. James L. Stewart and Ellen S. Stewart. **20:** 585—1948

SUBTITLES

Absorption and velocity for the following vapors: carbon disulphide, benzene, chloroform, methylene chloride, ethyl alcohol, acetone, ethyl iodide, carbon tetrachloride, ethyl ether, methyl iodide, methyl alcohol. William Railston. **11:** 110—1939

Normal modes and damping of gas bubbles in liquids. E. Meyer and K. Tamm. **11:** 366—1940

Supersonic interferometer for vapors. William Railston. **11:** 108—1939

Sound absorption coefficients of CO_2, N_2O, COS, CS_2 and SO_2. Edwin F. Fricke. **12:** 245—1940

On the history of "molecular absorption." L. J. Sivian. **19:** 254—1947 L.E.

10.5 Liquids, Ultrasonic Velocities, Dispersion, and Absorption

PAPERS

Ultrasonic absorption and velocity measurements in numerous liquids. Gerald W. Willard. **12:** 438—1941

Ultrasonic absorption in water. Francis E. Fox and George D. Rock. **12:** 505—1941

Absorption of ultrasonic waves in highly viscous liquids. Joseph Lawrence Hunter. **13:** 36—1941

Origin of the absorption of ultrasonic waves in liquids. Karl F. Herzfeld. **13:** 33—1941

10. ULTRASONICS (SUPERSONICS)
10.5 Liquids, Ultrasonic Velocities, Dispersion, and Absorption (continued)
10.6 Solids, Ultrasonic Velocities, Dispersion, and Absorption

10.5 Liquids, Ultrasonic Velocities, Dispersion, and Absorption (continued)

Supersonic transmission at oblique incidence through a solid plate in water. J. B. Smyth and R. B. Lindsay, **16:** 20—1944

Measurement of supersonic absorption in water by the balance method with mechanical integration. Eugene Tsung-Yueh Hsu. **17:** 127—1945

Absorption of supersonic waves in liquids. Charles Edwin Teeter, Jr. **18:** 488—1946

Absorption of ultrasonic waves in benzene. Brother John Quinn. **18:** 185—1946

Ultrasonic absorption in copper acetate and ethyl acetate. Robert T. Beyer and Myron C. Smith. **18:** 424—1946

Absorption of supersonic waves in water near one megacycle. L. W. Labaw and A. O. Williams, Jr. **19:** 30—1947

Measurements of ultrasonic absorption and velocity in liquid mixtures. F. H. Willis. **19:** 242—1947

Precision ultrasonic interferometer for liquids and some velocities in heavy water. D. R. McMillan, Jr., and R. T. Lagemann. **19:** 956—1947

Temperature coefficient of ultrasonic velocity in solutions. G. W. Willard. **19:** 235—1947

Study of ultrasonic velocity and absorption in liquid mixtures. Charles J. Burton. **20:** 186—1948

Ultrasonic absorption in water in the temperature range 0°–80°C. Myron C. Smith and Robert T. Beyer. **20:** 608—1948

ABSTRACTS

Alteration in the liquid structure of electrolytes as indicated by acoustic waves. Victor B. Corey and G. W. Stewart. **11:** 378—1940

Supersonic transmission at oblique incidence through a solid plate in water. J. B. Smyth and R. B. Lindsay. **14:** 127—1942

Fixed path supersonic interferometer for liquids. J. W. Ballou and J. C. Hubbard. **16:** 100—1944

Attenuation of sound waves in water by a reverberation method. R. W. Leonard. **18:** 252—1946

Attenuation of underwater sound. F. A. Everest and H. T. O'Neil. **18:** 255—1946

Method of measuring the velocity and absorption of sound in liquids. J. K. Galt and J. R. Pellam. **18:** 251—1946

Transmission of high frequency sound well beneath the ocean surface. M. J. Sheehy. **18:** 255—1946

Temperature coefficient of ultrasonic velocity in solutions. G. W. Willard. **19:** 287—1947

Velocity and absorption of sound in suspension and emulsions. R. J. Urick. **19:** 729—1947

Attenuation of longitudinal waves in high polymers. J. C. Smith and J. W. Ballou. **20:** 586—1948

Effects of high intensity ultrasonic radiation. J. F. Muller and G. W. Willard. **20:** 589—1948

Measurement of ultrasonic bulk-wave propagation in high polymers. A. W. Nolle. **20:** 587—1948

Onset of acoustical cavitation in fluids. F. G. Blake, Jr. **20:** 590—1948

Ultrasonic attention in solutions of high polymers. Jean Hoopes and Joseph Zallen. **20:** 586—1948

Ultrasonic investigation of molecular properties of liquids. Cyclic compounds. Alfred Weissler. **20:** 585—1948

Ultrasonic investigations of substances under high pressures. Gerald J. Holton. **20:** 586—1948

SUBTITLES

Errors in the measurement of absorption in liquids. Francis E. Fox and George D. Rock. **12:** 505—1941

Absorption *versus* temperature for olive oil, glycerine, linseed oil, and castor oil. Joseph Lawrence Hunter. **13:** 38—1941

Absorption of supersonic waves in water. **18:** 489—1946

Peculiar ultrasonic effect on a binary mixture of liquids. Paul J. Ernst. **19:** 372—1947 L.E.

Ultrasonic velocity in ethanol-water mixtures. A. Giacomini. **19:** 701—1947

Velocity measurements in liquids. R. H. Bolt and A. Giacomini. **20:** 331—1948

10.6 Solids, Ultrasonic Velocities, Dispersion, and Absorption

PAPERS

Ultrasonics and elasticity. H. F. Ludloff. **12:** 193—1940

Review of supersonic methods for measuring elastic and dissipative properties of solids. Sidney Siegel. **16:** 26—1944

Supersonic transmission at oblique incidence through a solid plate in water. J. B. Smyth and R. B. Lindsay. **16:** 20—1944

Supersonic reflectoscope, an instrument for inspecting the interior of solid parts by means of sound waves. Floyd A. Firestone. **17:** 287—1946

Standing wave technique of thickness measurements. John B. Butler and James B. Vernon. **18:** 212—1946

Refinements in supersonic reflectoscopy. Polarized sound. Floyd A. Firestone and Julian R. Frederick. **18:** 200—1946

Velocity of dilatation and Rayleigh waves in metal bars. J. Howard McMillen. **18:** 190—1946

Attenuation and scattering of high frequency sound waves in metals and glasses. W. P. Mason and H. J. McSkimin. **19:** 464—1947

Dispersion of compressional waves in isotropic rods of rectangular cross section. R. W. Morse. **20:** 833—1948

Measurement of ultrasonic bulk-wave propagation in high polymers. A. W. Nolle and S. C. Mowry. **20:** 432—1948

Ultrasonic solid delay lines. David L. Arenberg. **20:** 1—1948

ABSTRACTS

Ultrasonics and elasticity. H. F. Ludloff. **12:** 467—1941

Supersonic transmission at oblique incidence through a solid plate in water. J. B. Smyth and R. B. Lindsay. **14:** 127—1942

Measurements of elastic and dissipative properties of solids by supersonic methods. Sidney Siegel. **16:** 99—1944

Refinements in supersonic reflectoscopy. Floyd A. Firestone and Julian R. Frederick. **18:** 253—1946

10. ULTRASONICS (SUPERSONICS)

10.6 Solids, Ultrasonic Velocities, Dispersion, and Absorption (continued)
10.7 Physical Effects of Ultrasonic Waves
10.8 Chemical Effects of Ultrasonic Waves
10.9 Biological Effects of Ultrasonic Waves

10.6 Solids, Ultrasonic Velocities, Dispersion, and Absorption (continued)

Attenuation and scattering of high frequency sound waves in metals and glasses. W. P. Mason and H. J. McSkimin. **19:** 725—1947

Acoustic absorption in sand and soil. W. L. Nyborg and I. Rudnick. **20:** 597—1948

Attenuation of ultrasonic sound waves in water. R. W. Leonard. **20:** 224—1948

Dispersion of compressional waves in isotropic rods of rectangular cross section. R. W. Morse. **20:** 585—1948

Energy losses of sound waves in metals due to scattering and diffusion. W. P. Mason and H. J. McSkimin. **20:** 586—1948

Pulse method for measuring small changes in ultrasonic velocity in solids with temperature. Richard D. Holbrook. **20:** 590—1948

Theory of low frequency sound absorption in sodasilica glasses. Granio A. Korn. **20:** 585—1948

Ultrasonic measurement of the elastic properties of polycrystalline materials at high and low temperatures. Julian R. Frederick. **20:** 586—1948

SUBTITLES

On testing of metals by supersonics. Fritz Kruse. **11:** 367—1940

Lamb waves. **18:** 200—1946

Rayleigh waves. **18:** 200—1946

Shear waves. **18:** 200—1946

Velocity of dilatational waves in rods. T. D. Northwood. **19:** 505—1947 L.E.

Photoelastic solid delay line. David L. Arenberg. **20:** 13—1948

Reflection of waves in a solid at a boundary. David L. Arenberg. **20:** 9—1948

Relative velocities of vibrational modes of solids as a function of Poisson's ratio. David L. Arenberg. **20:** 6—1948

Variation of attenuation with frequency in plate glass. David L. Arenberg. **20:** 11—1948

Velocity and attenuation of longitudinal waves in certain solids. David L. Arenberg. **20:** 10—1948

10.7 Physical Effects of Ultrasonic Waves

PAPERS

High intensity ultrasonics: the power output of a piezoelectric quartz crystal. Leo F. Epstein, Walther M. A. Andersen, and Lewis R. Harden. **19:** 248—1947

Acoustic treatment of liquids in thin laminae. Caperton B. Horsley, R. Clark Jones, and Alan A. Smith. **20:** 182—1948

ABSTRACTS

Ultrasonic study of phase transition near the critical point. J. C. Hubbard and C. M. Herget. **12:** 467—1941

Apparatus for cavitation studies. F. G. Blake, Jr. **20:** 223—1948

Ultrasonic measurement of physical properties; techniques and their fields of application. John C. Hubbard. **20:** 599—1948

SUBTITLE

On testing of metals by supersonics. Fritz Kruse. **11:** 367—1940

10.8 Chemical Effects of Ultrasonic Waves

PAPER

Some applications of ultrasonics in high-polymer research. H. Mark. **16:** 183—1945

ABSTRACTS

High frequency treatment and investigation of organic high polymers. H. Mark. **16:** 100—1944

Chemical effects of ultrasonic irradiation: Reaction between carbon tetrachloride and water. Alfred Weissler, Herbert W. Cooper, and Stuart Snyder. **20:** 589—1948

SUBTITLE

Supersonics in a water-alcohol mixture and analysis of its intermolecular action. R. Parshad. **20:** 66—1948 L.E.

10.9 Biological Effects of Ultrasonic Waves

PAPERS

Biological and psychological effects of ultrasonics. Hallowell Davis. **20:** 605—1948

Some biological effects of intense high frequency airborne sound. C. H. Allen, H. Frings, and I. Rudnick. **20:** 62—1948

ABSTRACTS

Biological and psychological effects of ultrasonics. Hallowell Davis. **20:** 589—1948

Some biological effects of intense high frequency airborne sound. C. H. Allen and I. Rudnick. **20:** 221—1948

11. WAVES AND VIBRATIONS

11.1 General, Unclassified
11.2 Diffraction. Interference. Scattering. Reflection. Echoes. Standing Waves
11.3 Propagation of Sound. Absorption During Propagation. Velocity of Sound. Refraction. Wave-Length. Doppler Effect

11. Waves and Vibrations

11.1 General, Unclassified

PAPERS

On the perception of vibrations. George v. Békésy (Akustische Zeits. **4**, 316 (1939)). **11:** 487—1940

Applications and limitations of mechanical-electrical analogies, new and old. John Miles. **14:** 183—1943

Fifty horsepower siren. R. Clark Jones. **18:** 371—1946

Acoustical methods in supersonic aerodynamics. John W. Miles. **20:** 314—1948

SUBTITLES

Relations between hypergeometric and Bessel functions. W. R. Bennett. **15:** 171—1944

Tables of spherical Bessel functions. Vol. 1. Mathematical Tables Project, National Bureau of Standards. **19:** 509—1947 B.R.

The decibel notation. V. V. L. Rao. **19:** 509—1947 B.R.

11.2 Diffraction. Interference. Scattering. Reflection. Echoes. Standing Waves

PAPERS

Sound diffraction and absorption by a strip of absorbing material. John R. Pellam. **11:** 396—1940

Diffraction of sound around a circular disk. Henry Primakoff, Martin J. Klein, Joseph B. Keller, and E. L. Carstensen. **19:** 132—1947

Diffraction of sound due to right-angled joints in rectangular tubes. John W. Miles. **19:** 572—1947

Image interference in the presence of refraction. Robert W. Young. **19:** 1—1947

On the diffraction of a progressive sound wave by the human head. Francis M. Wiener. **19:** 143—1947

Sound diffraction by rigid spheres and circular cylinders. Francis M. Wiener. **19:** 444—1947

Diffraction of a sound wave by an infinite set of plates. John W. Miles. **20:** 370—1948

Diffraction of sound by circular disks and apertures. R. D. Spence. **20:** 380—1948

Notes on sound diffraction by rigid circular cones. Francis M. Wiener. **20:** 367—1948

ABSTRACTS

Diffraction at a step-down. Harry D. Polster and Frank H. Slaymaker. **19:** 732—1947

Acoustics of arches. Herbert Grove Dorsey. **20:** 597—1948

SUBTITLES

Scattering and radiation from circular cylinders and spheres. **19:** 262—1947 B.R.

Echoes at Echo Bridge. Arthur Taber Jones. **20:** 706—1948 L.E.

11.3 Propagation of Sound. Absorption During Propagation. Velocity of Sound. Refraction. Wave-Length. Doppler Effect

PAPERS

Influence of certain atmospheric conditions upon sound transmission at short ranges. Halson Vashon Eagleson. **12:** 427—1941

Sound velocities in gases under different pressures. R. C. Colwell and L. H. Gibson. **12:** 436—1941

Velocity of sound in air. H. C. Hardy, D. Telfair and W. H. Pielemeier. **13:** 226—1942

Air raid siren field tests. Laurence M. Ball. **14:** 10—1942

Propagation of sound waves in the atmosphere. B. Gutenberg. **14:** 151—1942

Survey on air raid alarm signals. John E. Volkmann and Max L. Graham. **14:** 1—1942

Acoustical tables for air and sea water. William L. Woolf. **15:** 83—1943

Extension of the Doppler principle to discontinuous periodic effects. Lionel Fleischmann. **15:** 103—1943

Kneser's sound absorption nomogram and other charts. W. H. Pielemeier. **16:** 273—1945

Young's modulus of elasticity of fibers and films by sound velocity measurements. J. W. Ballou and S. Silverman. **16:** 113—1944

Acoustic transmission through a fluid lamina. I. Rudnick. **17:** 245—1946

Transmission, reflection, and guiding of an exponential pulse by a steel plate in water. I. Theory. M. F. M. Osborne and S. D. Hart. **17:** 1—1945

Wave-front determination in a unidirectional supersonic beam. L. W. Labaw. **17:** 19—1945

Jungle acoustics. Carl F. Eyring. **18:** 257—1946

Propagation of plane sound waves in rarefied gases. Hsue-shen Tsien and Richard Schamberg. **18:** 334—1946

Propagation of sound in the atmosphere—attenuation and fluctuations. Vern O. Knudsen. **18:** 90—1946

Propagation of sound in an inhomogeneous and moving medium. I. D. Blokhintzev. **18:** 322—1946

Propagation of sound in an inhomogeneous and moving medium. II. D. Blokhintzev. **18:** 329—1946

Ray computation for non-uniform fields. John S. Saby and Wesley L. Nyborg. **18:** 316—1946

Reflection of sound signals in the troposphere. G. W. Gilman, H. B. Coxhead, and F. H. Willis. **18:** 274—1946

Theory of propagation of sound in a half-space of variable sound velocity under conditions of formation of a shadow zone. C. L. Pekeris. **18:** 295—1946

Theory of the propagation of sound in scattering and absorbing media. M. P. Givens, W. L. Nyborg, and H. K. Schilling. **18:** 284—1946

Transmission, reflection, and guiding of an exponential pulse by a steel plate in water. II. Experiment. M. F. M. Osborne and S. D. Hart. **18:** 170—1946

Acoustic determination of the physical constants of rubber-like materials. A. W. Nolle. **19:** 194—1947

Acoustical properties of homogeneous, isotropic rigid tiles and flexible blankets. Leo L. Beranek. **19:** 556—1947

Calculation of sound rays in the atmosphere. P. Rothwell. **19:** 205—1947

Fluctuations in intensity of an acoustic wave transmitted through a turbulent heated lamina. I. Rudnick. **19:** 202—1947

Image interference in the presence of refraction. Robert W. Young. **19:** 1—1947

11. WAVES AND VIBRATIONS

11.3 Propagation of Sound. Absorption During Propagation. Velocity of Sound. Refraction. Wave-Length. Doppler Effect (continued)

11.3 Propagation of Sound. Absorption During Propagation. Velocity of Sound. Refraction. Wave-Length. Doppler Effect (continued)

Microbarometric pressures from large high explosive blasts. Everett F. Cox. **19:** 832—1947

Propagation of an acoustic wave along a boundary. Isadore Rudnick. **19:** 348—1947

Propagation of sound through a liquid containing bubbles. E. L. Carstensen and L. L. Foldy. **19:** 481—1947

Ultrasonic propagation in open air. H. K. Schilling, M. P. Givens, W. L. Nyborg, W. A. Pielemeier, and H. A. Thorpe. **19:** 222—1947

Absorption and scattering for impedance boundary conditions on spheres and circular cylinders. M. Lax and H. Feshbach. **20:** 108—1948

Attenuation of audible sound in fog and smoke. Vern O. Knudsen, John V. Wilson, and Neal S. Anderson. **20:** 849—1948

Compressional wave front propagation through a simple vortex. R. B. Lindsay. **20:** 89—1948

Erratum: The propagation of an acoustic wave along a boundary. Isadore Rudnick. **20:** 149—1948

On the propagation of sound over snow. Robert B. Watson. **20:** 846—1948

Reflection and transmission of sound by a spherical shell. Joseph B. Keller and Herbert B. Keller. **20:** 310—1948

ABSTRACTS

Propagation of sound in the atmosphere—time fluctuations in intensity. L. P. Delsasso and V. O. Knudsen. **12:** 471—1941

Some acoustical phenomena in the Antarctic. Thomas C. Poulter. **12:** 474—1941

Corrections on the measurements of the velocity of sound in gases. W. H. Pielemeier and H. C. Hardy. **13:** 80—1941

Air raid siren tests in Detroit. Laurence M. Ball. **14:** 130—1942

Field measurements of air raid warning devices. V. L. Chrisler and W. F. Snyder. **14:** 129—1942

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11. WAVES AND VIBRATIONS
11.4 Radiation from Vibrating Objects. Acoustical Impedance. Mechanical Impedance

11.4 Radiation from Vibrating Objects. Acoustical Impedance. Mechanical Impedance (see also 5.3)

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11. WAVES AND VIBRATIONS

11.4 Radiation from Vibrating Objects. Acoustical Impedance. Mechanical Impedance (continued)

11.5 Sounds of Finite Amplitude. Distortion

11.6 Sound in Tubes

11.4 Radiation from Vibrating Objects. Acoustical Impedance. Mechanical Impedance (continued)

Acoustic impedance matching by means of screens. Frank H. Slaymaker and Mones E. Hawley. **20:** 594—1948

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11.5 Sounds of Finite Amplitude. Distortion

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11.6 Sound in Tubes

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11. WAVES AND VIBRATIONS

11.6 Sound in Tubes (continued)
11.6.1 Sources of Sound
11.7 Theory of Waves and Vibrating Systems

11.6 Sound in Tubes (continued)

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11.6.1 Sources of Sound (see also 7.8 and 11.4)

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11.7 Theory of Waves and Vibrating Systems (see also 5.4)

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11. WAVES AND VIBRATIONS
11.7 Theory of Waves and Vibrating Systems (continued)

11.7 Theory of Waves and Vibrating Systems (continued)

General theory of passive linear electroacoustic transducers and the electroacoustic reciprocity theorem. I. Leslie L. Foldy and Henry Primakoff. **17:** 109—1945

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11. WAVES AND VIBRATIONS
11.7 Theory of Waves and Vibrating Systems (continued)

11.7 Theory of Waves and Vibrating Systems (continued)

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13. UNDERWATER SOUND

13.1 General, Unclassified
13.2 Propagation of Sound in Water. Attenuation. Fluctuation
13.4 Reflection. Echoes. Structures for Absorbing Sound in Water
13.5 Interference. Diffraction
13.6 Scattering. Reverberation in Water

13. Underwater Sound

13.1 General, Unclassified

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The symbol PB stands for the Publication Board Report Number that appears in the Bibliography of Scientific and Industrial Reports issued by the Office of Technical Services in the United States Department of Commerce. M stands for the price of a microfilm copy of the Publication Board report, and P for the price of a photostatic copy. Copies of these reports may be obtained from the Library of Congress, Photoduplication Service, Publication Board Project, Washington 25, D. C. The order should be accompanied by a check or money order made payable to the Librarian of Congress. The prices given are for reports sent to purchasers in the United States, Canada, or Mexico.

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ANALYTIC SUBJECT INDEX TO CONTEMPORARY ACOUSTICAL LITERATURE

AS LISTED IN THE JOURNAL OF THE ACOUSTICAL SOCIETY OF AMERICA, VOLUMES 11–20, JULY 1939–NOVEMBER 1948

In most of the following references the name of a journal is followed by the volume number, in black face type, then the page reference, and finally, in parentheses, the date of issue. Where reference is made to an abstract journal that numbers its abstracts, the abstract number is given instead of a page reference. Titles of papers in other languages have been translated into English. Abbreviations for the names of journals follow those in the World List of Scientific Periodicals. For the meaning of PB, see page 72.

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1.6 Members and Membership Lists

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2. ARCHITECTURAL ACOUSTICS
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2.2 Auditorium Design

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2.2 Auditorium Design
2.3 Studies of Existing Auditoria
2.4 Sound Absorption, Theory and Methods of Measurement of

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2.4 Sound Absorption, Theory and Methods of Measurement of (continued)
2.5 Materials for Sound Absorption. Values of Absorption Coefficients and Acoustical Impedances
2.6 Noise Reduction by Increased Room Absorption

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2.8 Reverberation Measuring Instruments

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2.11 Vibration Insulating Supports

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2.11 Vibration Insulating Supports (continued)
2.12 Damping of Panels

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4.6 Loudness. Threshold Determinations

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4.6 Loudness. Threshold Determinations (continued)
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4.8 Phase Effects
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4.9 Pitch (continued)

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4.11 Theories of Hearing
4.12 Timbre
4.13 Ear Acoustical Impedance

4.10 Subjective Tones (continued)

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5.1 General, Unclassified (continued)

5.2 Amplifiers and Attenuators

5.1 General, Unclassified (continued)

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5.2 Amplifiers and Attenuators

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5.2 Amplifiers and Attenuators (continued)
5.3 Acoustical and Mechanical Impedance Measurement

5.2 Amplifiers and Attenuators (continued)

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5.3 Acoustical and Mechanical Impedance Measurement (see also 11.4)

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5. APPLIED ACOUSTICS, INSTRUMENTS AND APPARATUS

5.4 Analyzers and Filters, Mechanical and Electrical. Acoustic Filters. Oscillographs

5.4 Analyzers and Filters, Mechanical and Electrical. Acoustic Filters. Oscillographs (see also 5.15)

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5. APPLIED ACOUSTICS, INSTRUMENTS AND APPARATUS

5.4 Analyzers and Filters, Mechanical and Electrical. Acoustic Filters. Oscillographs (continued)
5.5 Audiometers
5.5.1 Broadcasting

5.4 Analyzers and Filters, Mechanical and Electrical. Acoustic Filters. Oscillographs (continued)

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5.5 Audiometers (see also 4.4 and 4.5)

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5.10 Navigational Instruments Using Air Sound. Altitude Measuring Instruments. Sound Ranging Geophysical Prospecting

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5.11 Oscillators, Electrical and Mechanical

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5.11 Oscillators, Electrical and Mechanical (continued)
5.12 Phase Meters
5.13 Public Address Systems and Sound Picture Installations

5.11 Oscillators, Electrical and Mechanical (continued)

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5.14 Rayleigh Disks
5.15 Sound Level Meters. Level Recorders. Sound Pressure Measurement

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5.15 Sound Level Meters. Level Recorders. Sound Pressure Measurement (see also 5.4)

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5. APPLIED ACOUSTICS, INSTRUMENTS AND APPARATUS
5.16d Disk Recording (including cutting and embossing) (continued)

5.16d Disk Recording (including cutting and embossing) (continued)

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5.16d Disk Recording (including cutting and embossing) (continued)

5.16d Disk Recording (including cutting and embossing) (continued)

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5. APPLIED ACOUSTICS, INSTRUMENTS AND APPARATUS
5.16f Film Recording (by photographic means)

5.16f Film Recording (by photographic means)

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5.17 Telephone. Telephone Receivers

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5.17 Telephone. Telephone Receivers

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5.19 Tuning Forks

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5. APPLIED ACOUSTICS, INSTRUMENTS AND APPARATUS

5.19 Tuning Forks (continued)

5.21 Vibration Devices. Devices for Generating or Damping Vibrations

5.19 Tuning Forks (continued)

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5.21 Vibration Devices. Devices for Generating or Damping Vibrations (see also 2.11 and 5.9)

See also
- 2.8 Reverberation Measuring Instruments
- 4.5 Instruments Relating to Hearing
- 9.6 Instruments Relating to Speech and Singing
- 10.3 Ultrasonic Instruments
- 13.11, 13.11n, and 13.11t. Instruments Relating to Underwater Sound

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5.21 Vibration Devices. Devices for Generating or Damping Vibrations (continued)

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6.1 General, Unclassified

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6.1 General, Unclassified (continued)

6.1 General, Unclassified (continued)

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6. MUSICAL INSTRUMENTS AND MUSIC

6.1 General, Unclassified (continued)
6.2 Bells, Xylophones. Other Instruments Having Rigid Vibrators
6.3 Brass Wind Instruments (lip vibrated)
6.4 Drums and Other Membranophonic Instruments
6.5 Pipe Organs

6.1 General, Unclassified (continued)

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6.2 Bells, Xylophones. Other Instruments Having Rigid Vibrators

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6.3 Brass Wind Instruments (lip vibrated)

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6.4 Drums and Other Membranophonic Instruments

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6.5 Pipe Organs

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6. MUSICAL INSTRUMENTS AND MUSIC

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6.7 Violin Family. Stringed Instruments except Keyboard Type
6.8 Wood Winds
6.9 Electrical Musical Instruments

6.7 Violin Family. Stringed Instruments except Keyboard Type

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6.9 Electrical Musical Instruments (continued)
6.10 Reed Organs. Accordions, Harmonicas

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7.1 General, Unclassified (continued)
7.2 Annoyance

7.1 General, Unclassified (continued)

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7. NOISE

7.2 Annoyance (continued)
7.3 Audiograms of Noise
7.5 Frequency Analyses of Noise

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7.5 Frequency Analyses of Noise (continued)
7.6 Noise in Buildings
7.7 Machinery Noise. Mufflers. Noise Silencers

7.5 Frequency Analyses of Noise (continued)

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7.7 Machinery Noise. Mufflers. Noise Silencers

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7. NOISE

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7.8 Noise Generators

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9.4 Frequency of Occurrence of Speech Sounds
9.5 Frequency Analyses of Speech Sounds
9.6 Instruments Relating to Speech and Singing

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9.10 Phonetics

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10. ULTRASONICS (SUPERSONICS)
10.7 Physical Effects of Ultrasonic Waves (continued)
10.8 Chemical Effects of Ultrasonic Waves
10.9 Biological Effects of Ultrasonic Waves

10.7 Physical Effects of Ultrasonic Waves (continued)

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11. WAVES AND VIBRATIONS

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11.2 Diffraction. Interference. Scattering. Reflection. Echoes. Standing Waves

11. Waves and Vibrations (see also 13)

11.1 General, Unclassified

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11.4 Radiation from Vibrating Objects. Acoustical Impedance. Mechanical Impedance (continued)
11.5 Sounds of Finite Amplitude. Distortion

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11.6 Sound in Tubes

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11.6 Sound in Tubes (continued)
11.6.1 Sources of Sound
11.7 Theory of Waves and Vibrating Systems

11.6 Sound in Tubes (continued)

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13. UNDERWATER SOUND

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13. Underwater Sound

13.1 General, Unclassified

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Underwater Sound Survey; New York Harbor Approaches. Completion Report. D. A. Proudfoot. OSRD Report 1862. NDRC Report 6.1–794. PB 31018. 41 pp. (August, 1943). M $1.00; P $3.00.

Frequency Analysis of an Underwater Explosion. Harry B. McCurdy. PB 39509. 30 pp. (1944). M $1.00; P $2.00.

Oceanographic Studies. Summary report. H. B. Hoff et al. OSRD Report 5207. NDRC Report 6.1–1933. PB 31020. 29 pp. (May, 1945). M $1.00; P $2.00. Includes studies of underwater telephony, echo-ranging, and triangulation listening ranging from submarines.

Training Activities. Completion Report. F. V. Hunt. OSRD 6.1–SR287–2084. PB L 86126. 24 pp. (May, 1945). M $1.50; P $3.00.

Oceanography In Japan. U. S. Naval Techn. Mission to Japan Report X-40(N). PB 49514. 68 pp. (March, 1946). M $2.00; P$5.00. Included in the report are: (H) Report on communication interferences in the sea; and (I) Abstracted reports on sounds produced by aquatic animals, with index to acquired disk recordings.

The Oscillations of the Gas Bubble Resulting from an Underwater Explosion, and the Distribution of Pressure in its Neighborhood. W. Doering. BIOS Halstead Exploiting Center Report 213. PB 30952. 31 pp. (May, 1946). M $1.00; P $3.00.

Standards Used by the USRL. Columbia Univ. Div. of War Research Underwater Sound Reference Laboratory. NDRC Report 6.1–2303. PB 31008. 130 pp. (July, 1945). M $3.00; P $9.00.

Effects of Hydrostatic Pressure on Bubble-Filled Coatings. Robert Herr. Mass. Inst. Technol. Acoustics Lab. Techn. Memo. No. 1 (Feb. 28, 1946).

Chemical Problems in the Development of Underwater Acoustic Materials. Joseph Zallen. Mass. Inst. Technol. Acoustics Lab. Techn. Memo. No. 4 (April 22, 1946).

300-Mile Wide Oceanic Layer Reflects Sound Waves. Sci. News Letter **49,** 344 (June 1, 1946).

Electro-Acoustic Investigation of Thin Coatings. Part I: Static Measurements. Aaron S. Filler. Mass. Inst. Technol. Acoustics Lab. Techn. Memo. No. 5 (June 30, 1946).

The Sound Pressure in Water Resulting from a Point Source in Air. E. Gerjuoy. Phys. Rev. **72,** 745 (Oct. 15, 1947). Abstract.

Acustica Subacquea ed Ultrasuoni (Underwater Sound and Ultrasonics). Maurizio Federici. (Società Editrice Internazionale, Torino, 1947). Short Italian review in Ricerca Sci. **18,** 190 (Jan.-Feb. 1948).

Phonograph Records (of Underwater Sounds from Submerged Submarines) for Training Operators Expendible Radio Sonic Buoy. Series D-16. W. D. Neff and H. L. Bumbaugh. Columbia Univ. Div. of War Research Report D16/R122. PB L 67619. 23 pp. (not dated). M $1.00; P $2.00.

13.2 Propagation of Sound in Water. Attenuation. Fluctuation

Ein -und Zweidimensionale Ausbreitung von Wasserschall im Rohr bzw. im Flachbecken (One- and Two- Dimensional Spreading of Sound in Water in a Tube or in a Shallow Basin). Konrad Tamm (1940). In German. FIAT Microfilm Reel I 274, of dissertations in the library of the University at Erlangen, Frames 5765–5776. PB L 73712. Enlargement print $1.50. For same title by same author in Akust. Z. see reference in J. Acoust. Soc. Amer. **13,** 74 (July, 1941).

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13.2 Propagation of Sound in Water. Attenuation. Fluctuation (continued)

13.2 Propagation of Sound in Water. Attenuation. Fluctuation (continued)

Sound Transmission in Sea Water, a Preliminary Report. Woods Hole Oceanographic Institution. OSRD Report 233. PB 31049. 85 pp. (Feb. 1941). M $2.00; P $6.00.

Submarine Detection — Air Bubbles in Sea Water. H. Nyquist. PB 33392. 17 pp. (Oct. 1941). M $1.00; P $2.00.

Submarine Detection — Note on Increasing the Range by Using Bottom Reflections. H. Nyquist. PB 32666. 2 pp. (Oct. 1941). M $1.00; P $1.00.

One-Dimensional and Two-Dimensional Propagation of Sound Waves in Water, in Tubes, and Tanks. K. Tamm. Alta Frequenza **11**, 251–252 (May, 1942).

Attenuation of Underwater Sound. Revised with Minor Changes and Additions. F. A. Everest and H. T. O'Neil. PB L 63764. 44 pp. (July, 1942). M $1.00; P $3.00.

Attenuation of Underwater Sound; Revised with Minor Changes and Additions. F. A. Everest and H. T. O'Neil. PB 50861. 43 pp. (July, 1942). M $1.00; P $3.00. Results of measurements made in San Diego Harbor for the National Defense Research Committee.

Investigation of Water Noise Conditions in Chesapeake Bay, May 18 to June 3, 1942. D. P. Loye and D. A. Proudfoot. Columbia Univ. Div. of War Research Report D12B/-3289. PB L 67715. 62 pp. (July, 1942). M $2.00; P $5.00.

Preliminary Measurements of the Acoustic Properties of Disturbed Water. E. Dietze. NDRC Report C4–205. PB 31133. 14 pp. (Sept. 1942). M $1.00; P $1.00.

A Laboratory Study of Surface and Internal Wave Motion. Calif. Univ. Div. of War Research Report UCDWR U3. PB 48634. 25 pp. (Nov. 1942). M $1.00; P $2.00. Experiments conducted to obtain information concerning some of the movements in the ocean which may have an effect upon sound transmission.

Sound Transmission Tests at Low and High Frequencies. D. P. Love et al. Memorandum. Sept. 10 to Nov. 18, 1942. NDRC Report 6.1–551. PB 31029. 23 pp. (Dec. 1942). M $1.00; P $2.00. Part of a study of ship and harbor noises for the effective use of sonic harbor protection systems.

Sound Transmission Tests [in Shallow Water] at Low and High Frequencies, September 10 to November 18, 1942. Columbia Univ. Div. of War Research Memo. G2/R112. PB L 63806. 25 pp. (Dec. 1942). M $1.00; P $2.00.

Blanking and Screening by Surface Wakes. Calif. Univ. Div. of War Research Report UCDWR M38. PB L 77752. 6 pp. (March, 1943). M $1.00; P $1.00.

Blanking and Screening by Surface Wakes. Calif. Univ. Div. of War Research Report UCDWR M38. PB L 63769. 6 pp. (March, 1943). M $1.00; P $1.00.

Factors Affecting Long Distance Sound Transmission in Sea Water. A study of Radio Acoustic Ranges from data taken by the U. S. Coast and Geodetic Survey. George P. Woollard. OSRD Report 1505. NDRC Report 6.1–426. PB 32664. 27 pp. (March, 1943). M $1.00; P $2.00.

Variation of the Sound Field Near the Surface in Deep Water. H. T. O'Neil and T. F. Johnson. Calif. Univ. Div. of War Research Report UCDWR U49. PB 40603. 22 pp. (March, 1943). M $1.00; P $2.00.

Acoustic Properties of Gas Bubbles in a Liquid. Lyman Spitzer. Jr. OSRD Report 1705. NDRC Report 6.1–918. PB 31026. 80 pp. (July, 1943). M $2.00; P $6.00.

Report on the Propagation of Underwater Sound at Low Frequencies as a Function of the Acoustic Properties of the Bottom. John M. Ide et al. Naval Research Lab. Report S-2113. PB 22785. 177 pp. (August, 1943).

Some General Ideas Concerning the Transmission of Sound in the Deep Sea. Carl Eckart. Calif. Univ. Div. of War Research Report UCDWR M108. PB 40736. 6 pp. (Sept. 1943). M $1.00; P $1.00.

Some Shallow Water Sound Propagation Measurements in the Thirteenth Naval District. California Univ. Div. of War Research Report UCDWR M126. PB 40793. 27 pp. (Oct. 1943). M $1.00; P $2.00. Propagation measurements over a coarse gravel or rocky bottom.

Conclusions Derived from the Analysis [of Underwater] Transmission Data Obtained During Harbor Surveys. California Univ. Div. of War Research Report UCDWR U110. PB L 81334. 25 pp. (Oct. 1943). M $1.50; P $3.00.

Outline of Proposed Program of Sound Propagation Measurements in Deep Water. California Univ. Div. of War Research. PB L 81337. 3 pp. (Nov. 1943). M $1.00; P $1.00.

Sound Transmission Measurements Made off San Diego from August 31 to Sept. 10, 1943; with an Appendix on the Theory of Propagation of Low Frequency Sound in Deep Water. C. L. Pekeris. OSRD Report 3335. NDRC Report 6.1–047. PB 31048. 82 pp. (Feb. 1944). M $2.00; P $6.00.

Laboratory Studies of the Acoustic Properties of Wakes. I. Scattering and Absorption of Sound by the Wake of a Small Submersible Propeller. II. Role of Bubbles in Wakes. Jeffries Wyman et al. OSRD Report 3441. NDRC Report 6.1–1069. PB 31047. 67 pp. (March, 1944). M $2.00; P $5.00.

Some Experiments on the Transmission of Continuous Sound in 100-Fathom to 600-Fathom Water. California Univ. Div. of War Research Report UCDWR M193. PB 40786. 33 pp. (March, 1944). M $1.00; P $3.00.

Transmission Survey, Block Island Sound. Completion Report. W. B. Snow et al. OSRD Report 3511. NDRC Report 6.1–1027. PB 31016. 108 pp. (March, 1944). M $3.00; P $8.00.

Transmission Survey, Block Island Sound. Completion Report. W. B. Snow and others. Columbia Univ. Div. of War Research Report D12/R616. PB L 62731. 206 pp. (March, 1944). M $5.00; P $14.00. Includes acoustic and oceanographic measurements. The acoustic data consist of background noise and transmission loss.

General Theory of the Propagation of Sound through a Liquid Containing Air Bubbles. L. L. Foldy. OSRD Report 3601. NDRC Report 6.1–1378. PB 31027. 51 pp. (April, 1944). M $2.00; P $4.00.

Transmission Loss of Underwater Sound off Block Island. Mass. Inst. Techn. NDRC Report 6.1–1058. PB 31017. 8 pp. (May, 1944). M $1.00; P $1.00.

Propagation of Sound through a Liquid Containing Bubbles. Part II: Experimental Results and Theoretical Interpretation. E. L. Carstensen and L. L. Foldy. OSRD Report 3872. NDRC Report 6.1–1629. PB 31028. 85 pp. (June, 1944). M $2.00; P $6.00.

13. UNDERWATER SOUND

13.2 Propagation of Sound in Water. Attenuation. Fluctuation (continued)
13.3 Velocity of Sound in Water. Refraction. Doppler Effect
13.4 Reflection. Echoes. Structures for Absorbing Sound in Water

13.2 Propagation of Sound in Water. Attenuation. Fluctuation (continued)

Some Sound Propagation Measurements in the Fourteenth Naval District. California Univ. Div. of War Research Report UCDWR M228. PB 40791. 78 pp. (June, 1944). M $2.00; P $6.00. During these tests, the usual depth of the broad-band sound source was 10 feet, that of the receiving hydrophone 50 feet.

Transmission of 24 kc and 60 kc Sound in Very Shallow Water, (a) June, 1944, (b) October, 1944. M. J. Sheehy. NDRC 6.1 Reports 2525 and 2532. California Univ. Div. of War Research Internal Reports A31 and A31a. PB L 86240 and PB L 86240-S. 21 pp. and 6 pp. (August and Oct. 1944). M $1.50 and $1.00; P $3.00 and $1.00.

The Attenuation of Sound in the Sea. Carl Eckart. Calif. Univ. Div. of War Research Report UCDWR U236. NDRC Report 6.1–1532. PB 40795. 48 pp. (July, 1944). M $1.00; P $4.00.

Transmission Measurements in the Vicinity of San Diego, Calif. Completion report. W. B. Snow et al. NDRC Report 6.1–1574. PB 31019. 63 pp. (Sept. 1944). M $2.00; P $5.00. A study of shallow water sound transmission.

Fluctuation in the Level of Transmitted Sound. Columbia University Div. of War Research. PB 33401. 2 pp. (Nov. 1944). M $1.00; P $1.00. Points out that useful information could be obtained by measurement of the fluctuations of the echo from the bottom when the transducer is directed vertically downward over a smooth sand or otherwise uniform bottom.

Fluctuation of Transmitted Sound in the Ocean. Columbia University, Div. of War Research, Sonar Analysis Section, Technical memorandum No. 6. NDRC Report 6.1–1883. PB 31030. 42 pp. (Jan. 1945). M $1.00; P $3.00.

Theory of Propagation of Explosive Sound in Shallow Water. C. L. Pekeris. OSRD Report 6545. NDRC Report 6.1–1891. PB 31063. 195 pp. (Jan. 1945). M $4.00; P $13.00.

Connection between Fluctuation of Transmitted Sound and the Roll and Pitch of the Transmitting Ship. Columbia Univ. Div. of War Research. PB 33383. 2 pp. (Feb. 1945). M $1.00; P $1.00.

Method of Reading Sound Field Records: Appendix I to UCDWR Report M336, Processing Sound Field Data. Calif. Univ. Div. of War Research Report UCDWR M336.1. PB 51080. 2 pp. (Nov. 1945). M $1.00; P $1.00. Two deep water runs were read in four different ways to find a method that would keep the processing of the sound field data more nearly up-to-date with their gathering.

The Transmission of Sound at 56 kc [Through Water]. Calif. Univ. Div. of War Research Report UCDWR M378. PB 48644. 10 pp. (Nov. 1945). M $1.00; P $1.00.

Transmission of Underwater Sound at Lower Frequencies. Interim Report. Calif. Univ. Div. of War Research Report UCDWR U362. PB 48651. 48 pp. (Nov. 1945). M $1.00; P $4.00. The frequencies considered are from 0.2 to 7.5 kc.

Transmission of 24 kc Sound in Shallow Water. Calif. Univ. Div. of War Research Report UCDWR M368. PB 48632. 28 pp. (Nov. 1945). M $1.00; P $2.00.

The Additive Effects of Wind Force, Thermal Gradient and Particle Size on the Transmission of 24 kc Sound, Over Sand Bottoms in Shallow Water. Calif. Univ. Div. of War Research Report UCDWR M375. PB 48643. 21 pp. (Dec. 1945). M $1.00; P $2.00.

Long-Range Sound Transmission: Interim Report No. 1. March 1, 1944–Jan. 20, 1945. Maurice Ewing and J. LaMar Worzel. Woods Hole Oceanographic Institution Report 9. PB 22738. 78 pp. (August, 1945).

Transmission Measurements [of Underwater Sound] in the Vicinity of San Diego, California. Completion Report. W. B. Snow and others. Columbia Univ. Div. of War Research Report D12F/R822. PB L 85548. 63 pp. (Sept. 1944). M $2.50; P $7.50.

Overlays Useful in the Analysis of Sound Transmission Data. Calif. Univ. Div. of War Research Report UCDWR M391. PB 51060. 15 pp. (Feb. 1946). M $1.00; P $1.00. Overlays for identifying and determining empirical parameters for three aspects of underwater sound transmission: Attenuation and divergence, image interference, and single bottom reflection.

[Underwater] Transmission of 24 kc Sound at Short Ranges. California Univ. Div. of War Research Report UCDWR M421. PB L 81333. 17 pp. (May, 1946). M $1.25; P $2.00.

Compressional Viscosity and Sound Absorption in Water at Different Temperatures. F. E. Fox and G. D. Rock. Phys. Rev. **70**, 68–73 (July, 1946).

Underwater Sound Fields. U. S. National Defense Research Committee. PB 32667. 20 pp. (not dated). M $1.00; P $2.00

13.3 Velocity of Sound in Water. Refraction. Doppler Effect

Fluchtentafeln zur Bestimmung der Horizontalen Schallgeschwindigkeit aus Salzgehalt und Temperatur des Meerwassers (Tables for Determining the Horizontal Velocity of Sound from the Salt Content and Temperature of Sea Water). K. Kalle. Ann. Hydrogr., Berlin, **69**, 105 (1941).

Effect of the Thermocline on the Propagation of Sound. Report No. 5. Paul S. Epstein. PB 40735. 28 pp. (March, 1942). M $1.00; P $2.00.

Über den Schalldurchgang durch Metallplatten in Flüssigkeiten bei Schrägem Einfall einer Ebenen Welle (The Passage of Sound Through Metal Plates Immersed in Fluids, When the Waves are Plane and are Incident Obliquely). J. Götz. Akust. Z **8**, 145 (1943).

Interim Report on Sound Transmission Measurements in Rubber Strips (Material 2024). A. W. Nolle. Mass. Inst. Technol. Acoustics Lab. Techn. Memo. No. 2 (Feb. 28, 1946).

13.4 Reflection. Echoes. Structures for Absorbing Sound in Water

Observations of Echo Signals obtained using Variable Frequency Transmission. Edwin M. McMillan. PB L 79550. 5 pp. (July, 1942). M $1.00; P $1.00. Deals with large amplitude fluctuations in underwater echoes.

Echoes from Wakes. Carl F. Eyring and others. PB L 77291. 19 pp. (August, 1942). M $1.00; P $2.00.

13. UNDERWATER SOUND

13.4 Reflection. Echoes. Structures for Absorbing Sound in Water (continued)
13.5 Interference. Diffraction
13.6 Scattering. Reverberation in Water

13.4 Reflection. Echoes. Structures for Absorbing Sound in Water (continued)

Reflections from a Two-Foot Diameter Steel Sphere. E. Dietze. NDRC Report 6.1–598. PB 33398. 7 pp. (Jan. 1943). M $1.00; P $1.00. The reflections from the sphere are compared with those from a man occupying the same position in the water as the sphere.

Reflection of Sound in the Ocean from Temperature Changes. R. R. Carhart. Calif. Univ. Div. of War Research Report UCDWR U74. PB 40797. 24 pp. (May, 1943). M $1.00; P $2.00.

Relative Echo Intensity *Versus* Aspect. F. E. Gilbert, Jr. and J. K. Nunan. PB 33381. 8 pp. (March, 1944). M $1.00; P $1.00.

Amplitude Fluctuations of Transmitted and Reflected Sound Signals in the Ocean. Interim Report. M. J. Sheehy. California Univ. Div. of War Research Report A29. PB L 86491. 38 pp. (August, 1944). M $1.75; P $4.00.

Echoes from Swells. George E. Duvall. NDRC 6.1 Report 1917. California Univ. Div. of War Research Internal Report A43. PB L 86235. 7 pp. (Oct. 1944). M $1.00; P $1.00.

Lloyd Mirror Effect on Broad Band Source. J. J. Markham. Columbia Univ. Div. of War Research Memo G1/R1196. PB L 60301. 15 pp. (Nov. 1944). M $1.00; P $1.00. Discusses the case when broad band sources are used in place of those of a single frequency. This case is the more common in underwater sound work.

The Nature of Under-Sea Echo. V. S. Anastasevich. J. Tech. Phys. USSR **16** (No. 3), 371–373 (1946). Sci. Abs. **A50,** 256 (Feb. 1947). In Russian.

Theoretical Investigation of the Causes of Non-Specular Reflection from Uncoated Steel Plates in Water. G. W. McClure. Mass. Inst. Technol. Acoustics Lab. Techn. Memo. No. 3 (Feb. 28, 1946).

Experimental Investigation of Non-Specular Reflection of Sound from Submerged Steel Plates. W. J. Finney. Mass. Inst. Technol. Acoustics Lab. Techn. Memo. No. 8, 39 pp. (Oct. 20, 1946).

Non-Specular Reflection of Sound from Submerged Plates. Richard D. Fay. Mass. Inst. Technol. Acoustics Lab. Techn. Memo. No. 7 (Oct. 20, 1946).

The Vertical Reflection of Supersonic Sound from the Sea Bottom. R. W. Raitt. Phys. Rev. **72,** 745 (Oct. 15, 1947). Abstract.

Echoes from Wakes. Carl F. Eyring and others. PB L 79554. 18 pp. (not dated). M $1.00; P $2.00.

13.5 Interference. Diffraction

Theory of Diffraction of Sound in the Shadow Zone. C. L. Pekeris. OSRD Report 1467. NDRC Report 6.1–846. PB 31059. 70 pp. (May, 1943). M $2.00; P $5.00.

Distribution of Amplitudes if Two Rays with Random Phase and Given Amplitude Distribution Interfere. Columbia Univ. Div. of War Research. PB 33406. 5 pp. (Jan. 1945). M $1.00; P $1.00. The purpose is to express mathematically the distribution function of the amplitude of the resultant of direct and surface reflected sound if the distribution functions of each are given.

Lloyd Mirror Effect in the Presence of a Temperature Gradient. Columbia Univ. Div. of War Research. PB 33408. 2 pp. (Jan. 1945). M $1.00; P $1.00.

13.6 Scattering. Reverberation in Water

Notes on the Oceanographic Origins of Reverberations. C. O. Iselin. NDRC Report C4–030. PB 33387 and 39705. 6 pp. and 6 pp. (Nov. 1941). M $1.00; each P $1.00 each.

Theory of Reverberation and Echo. Carl H. Eckart. PB L 81495. 14 pp. (Nov. 1941). M $1.25; P $2.00.

Reverberations in Sea Water — Theoretical Considerations. H. Nyquist. NDRC Report C4 — 036. PB 31128. 12 pp. (Dec. 1941). M $1.00; P $1.00.

Reverberation Studies. Progress Report. Carl F. Eyring. PB L 77769, 3 pp. (Feb. 1942). M $1.00; P $1.00. Reverberation in the ocean at two frequencies.

[Underwater] Reverberation Studies. Carl F. Eyring. PB L 80866. 4 pp. (Feb. 1942). M $1.00; P $1.00. For similar titles by same author see Refs. 165–168 in J. Acoust. Soc. Amer. **20,** 78 (Jan. 1948).

Multiple Scattering. Carl F. Eyring and others. PB L 77738. 25 pp. (April, 1942). M $1.00; P $2.00. The role of multiple scattering in ocean reverberation.

Multiple Scattering. Carl F. Eyring. PB L 79551. 25 pp. (April, 1942). M $1.00; P $2.00. A study in ocean acoustics.

The Detection of an Echo in the Presence of Reverberation. Carl Eckart. OSRD Report 773. PB L 77750. 21 pp. (May, 1942). M $1.00; P $2.00.

Theoretical Discussion of Reverberation. C. L. Pekeris. OSRD Report 684. NDRC Report C4–097. PB 31110. 30 pp. (May, 1942). M $1.00; P $2.00.

Time Decay of Reverberations in Sea Water — Scattering Hypothesis. S. O. Rice. NDRC Report C4–069. PB 32673. 13 pp. (May, 1942). M $1.00; P $1.00.

Order of Magnitude of Reverberations — Scattering Due to Uneven Temperature Distribution on Water Surface. S. O. Rice. NDRC Report C4–070. PB 31131. 6 pp. (June, 1942). M $1.00; P $1.00.

Report of Reverberation Studies off Boothbay Harbor, Maine. Lewis R. Runaldue and Elmer J. Wade. NDRC Report C4–478A. PB 33385. 15 pp. (Nov. 1942). M $1.00; P $1.00.

Reduction of Reverberation with Present Echo Ranging Equipment. L. J. Sivian and Carl F. Eyring. PB L 79555. 2 pp. (May, 1942). M $1.00; P $1.00.

Scattering of Underwater Sound by Solid Particles and Air Bubbles. George E. Duvall. California Univ. Div. of War Research Report M40. PB L 81340. 11 pp. (Feb. 1943). M $1.25; P $2.00.

Volume Reverberation, Scattering, and Attenuation *vs.* Frequency. R. J. Christensen et al. Calif. Univ. Div. of War Research Report U50. OSRD Report 1555. NDRC Report 6.1–670. PB 39716. 35 pp. (April, 1943). M $1.00; P $3.00.

Acoustic Measurement on Surface Wakes in San Diego Harbor. Richard R. Carhart and George E. Duvall. Calif. Univ. Div. of War Research Report UCDWR U62. PB 52853. 25 pp. (May, 1943). M $1.00; P $2.00.

13. UNDERWATER SOUND

13.6 Scattering. Reverberation in Water (continued)
13.7 Radiation from Objects Vibrating under Water. Acoustical Impedance. Mechanical Impedance
13.8 Sound Generation by Fluid Motion, Bubbles, Turbulence, or Cavitation
13.9 Noise in Water. Ship Noise. Biological Noises

13.6 Scattering. Reverberation in Water (continued)

Bottom Reverberations. Dependence on Frequency. R. J. Christensen et al. Calif. Univ. Div. of War Research Report U79. OSRD Report 1766. NDRC Report 6.1-677. PB 39718. 19 pp. (June, 1943). M $1.00; P $2.00.

A System of Recording Reverberation as it Occurs in the Ocean. Calif. Univ. Div. of War Research Report UCDWR M111. PB L 61062. 41 pp. (August, 1943). M $1.00; P $3.00.

Submarine Detection. Reverberations from Large Inhomogeneities. H. Nyquist. NDRC Report 6.1-125. PB 31032. 5 pp. (March, 1944). M $1.00; P $1.00.

Submarine Detection. Interim Report on Masking of Echo by Reverberations. H. Nyquist. NDRC Report 6.1-124. PB 31031. 9 pp. (March, 1944, with addendum May 22, 1944). M $1.00; P $1.00.

Scattering of Sound by the Surface of the Sea. L. I. Schiff. Calif. Univ. Div. of War Research Report UCDWR M217. PB 40790. 1 p. (May, 1944). M $1.00; P $1.00. Deals with sound traveling in water, and nearly parallel to the surface.

Bottom Reverberation at 24 kc — E. W. Scripps Data. R. R. Carhart. NDRC 6.1 Report 2544. California Univ. Div. of War Research Internal Report A7. PB L 86241. 31 pp. (May, 1944). M $1.75; P $4.00.

Frequency Spread of Reverberation as Measured with the Period Meter. Columbia Univ. Div. of War Research. PB 33407. 2 pp. (Jan. 1945). M $1.00; P $1.00.

Apparatus for Recording Reverberation in the Sea. Leonard N. Liebermann. PB 33400. 11 pp. (Feb. 1945). M $1.00; P $1.00.

Submarine Detection — Further Laboratory Investigations of Masking of Echoes by Reverberations. Interim report. W. E. Reid and A. G. Chapman. PB L 77742. 5 pp. (Feb. 1945). M $1.00; P $1.00.

Stratification of Sound Scatterers in the Ocean. Calif. Univ. Div. of War Research Report UCDWR M397. PB L 60290. 29 pp. (Feb. 1946). M $1.00; P $2.00. A study of diurnal migration and geographic extent of the deep layers of sound scatterers in the ocean.

A Theory of Underwater Reverberation due to Sound Scattering. G. M. Suharevsky. C. R. Acad. Sci. URSS **55** (No. 9), 813-816 (1947). Sci. Abstr. **A50,** 3097 (Nov. 1947).

13.7 Radiation from Objects Vibrating under Water. Acoustical Impedance. Mechanical Impedance

Under-Water Impedance Measurements. Richard L. Brown and John R. Pellam. PB L 86110. 22 pp. (May, 1942). M $1.50; P $2.00. Condensed Report of Same. 5 pp. M $1.00; P $1.00.

Radiation of a Sound in Water as Affected by Depth of Submersion. N. N. Andreyev et al. Abstracted from C. R. Acad. Sci. URSS **47,** 400-402 (May 30, 1945). Wireless Engr. **23,** A133 (July, 1946).

Sound Radiation from a Source Placed in Water at a Small Depth. L. M. Brekhovskikh. Abstracted from C. R. Acad. Sci. URSS **47,** 396-399 (May 30, 1945). Wireless Engr. **23,** A133 (July, 1946).

Direct Measurement of Impedance. O. H. Schuck and W. A. Felsing. OSRD 6.1-SR287-891. PB L 86111. 7 pp. (June, 1947). M $1.00; P $1.00. A method for measuring the impedance of an underwater sound transducer.

Caratteristica Direzionale di un Emettitore Cilindrico con Riflettore Conico Coassiale (Directional Characteristics of a Cylindrical Emitter with a Coaxial Conical Reflector). Giovanni Bacchi. Alta Frequenza **17,** 74-78 (April, 1948). In Italian. Theoretical discussion of certain underwater sound sources.

13.8 Sound Generation by Fluid Motion, Bubbles, Turbulence, or Cavitation

Versuche über die Entstehung der Druckstösse bei der Kavitation (Investigations on the Origin of Shock Waves from Cavitation). H. G. Möller and A. Schoch. Akust. Z. **6,** 165 (1941).

13.9 Noise in Water. Ship Noise. Biological Noises

Propeller Noise — Tentative Discussion. H. Nyquist. NDRC Report C4-067. PB 31130. 12 pp. (April, 1942). M $1.00; P $1.00.

Water Background Noise in San Diego Area. F. A. Everest and others. PB L 77289 or 80672. 32 pp. or 31 pp. (August, 1942). M $1.00; P $3.00.

Underwater Sounds of Biological Origin. Martin W. Johnson. Calif. Univ. Div. of War Research Report UCDWR U28. PB 48635. 26 pp. (Feb. 1943). M $1.00; P $2.00.

Deep-Sea Water Background Noise. California Univ. Div. of War Research Report UCDWR M34. PB 40621. 8 pp. (Feb. 1943). M $1.00; P $1.00.

Underwater Reproduction of Submarine Noise with Bostwick Projector. J. J. Markham and E. E. Teal. Columbia Univ. Div. of War Research Memo G12/R221. PB 53027. 2 pp. (March, 1943). M $1.00; P $1.00.

Underwater Sound Output from Submarine Charging Batteries. Calif. Univ. Div. of War Research Report UCDRW M43. PB 40737. 6 pp. (March, 1943). M $1.00; P $1.00.

Noise Survey, Thames River East of State Pier, New London. A. K. Tatum. Columbia Univ. Div. of War Research Memo. G1/R246. PB L 67702. 5 pp. (April, 1943). M $1.00; P $1.00.

Preliminary Survey of Certain Biological Underwater Sounds on the East Coast of North America. Martin W. Johnson. Calif. Univ. Div. of War Research Report U63. NDRC Report 6.1-963. PB 39701. 11 pp. (May, 1943). M $1.00; P $1.00.

(a) Key West Submarine and Water Noise Measurements. (b) Supplement to Same. D. P. Loye and others. Columbia Univ. Div. of War Research Reports GI/R300 and GI/R361. PB L 81362 and PB L 81362-S. 28 pp. and 9 pp. (April and June, 1943). M $1.50 and $1.00; P $3.00 and $1.00.

Observations and Operations of Ship's Noise Aboard the USS Balao, April 27, 1943. Robert Y. Chapman. Columbia Univ. Div. of War Research Report D24/R314. PB L 81361. 7 pp. (May, 1943). M $1.00; P $1.00. The noises examined were those created by the submarine itself.

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13.9 Noise in Water. Ship Noise. Biological Noises (continued)
13.10 Sounds of Finite Amplitude in Water. Explosions. Distortions. Cavitation

13.9 Noise in Water. Ship Noise. Biological Noises (continued)

Underwater Sound Survey — Fishers Island. D. A. Proudfoot. Columbia Univ. Div. of War Research Report D12C/R401. PB L 85545. 3 pp. (May, 1943). M $1.00; P $1.00.

Ambient Noise Survey, Miami Area. First Four Cruises to Bahamas, Cay Sal Bank, and East Coast of Florida. D. A. Proudfoot and H. B. Hoff. PB 31022. 36 pp. (August, 1943). M $1.00; P $3.00.

Ambient Noise Survey, Miami Area. (First Four Cruises to Bahamas, Cay Sal Bank, and East Coast of Florida). D. A. Proudfoot and H. B. Hoff. Columbis Univ. Div. of War Research Report D46A/R470. PB L 85544. 36 pp. (August, 1943). M $1.75; P $4.00.

A Survey of Biological Underwater Noises off the Coast of California and in Upper Puget Sound. Martin W. Johnson. Calif. Univ. Div. of War Research Report U100. OSRD Report 1929. NDRC Report 6.1–1113. PB 39717. 12 pp. (Sept. 1943). M $1.00; P $1.00.

Some Ambient Water Noise Measurements in the Thirteenth Naval District. California Univ. Div. of War Research Report UCDWR M120. PB 40803. 9 pp. (Oct. 1943). M $1.00; P $1.00. A survey of acoustic and oceanographic conditions in an inland waterway.

Some Ambient Water Noise Measurements in the Fourteenth Naval District, with Supplement. Calif. Univ. Div. of War Research Reports UCDWR M122 and M122a. PB 48641 and 48642. 24 pp. and 4 pp. (Oct. 1943, and Jan. 1944). M $1.00; P $2.00 and $1.00. An intense raucous noise, of unknown but presumably biological origin, and exhibiting pronounced diurnal variation, has a marked peak at 3000 cycles/sec.

Ambient Noise Survey, Miami Area. Martin Johnson et al. PB 31023. 66 pp. (Jan. 1944). M $2.00; P $5.00. For completion report see Ref. 320.

Underwater Noise and the Distribution of Snapping Shrimp with Special Reference to the Asiatic and the Southwest and Central Pacific Areas. Martin W. Johnson. Calif. Univ. Div. of War Research Report UCDWR U146. PB 40788. 7 pp. (Jan. 1944). M $1.00; P $1.00.

Ambient Noise Survey, Miami Area. Martin Johnson and others. Columbia Univ. Div. of War Research Report D46A/R532. PB L 85544-S. 66 pp. (Jan. 1944). M $2.50; P $7.00. Supplement to Ref. 182.

Propeller and Ship Sounds in Water. German Oberkommando Marine. Accurate Translation Service Translation 55. Part I, PB L 88879. Parts II and III, PB L 88880. 113 pp. and 150 pp. M $3.75 and $4.50; P $12.00 and $15.00. Translation of a report on a session held by a group of the German Naval High Command on Feb. 6, 1944.

Investigation of Biological Underwater Background Noises in the Vicinity of Beaufort, North Carolina. L. H. Rumbaugh. Naval Ordnance Lab. Report 880. PB L 66121. 48 pp. (March, 1944). M $1.00; P $4.00.

Statistical Analysis of Miami Area Ambient Noise Survey Data. H. B. Hoff et al. PB 39703. 6 pp. (May, 1944). M $1.00; P $1.00. A total of 191 measurements. Analyses of water noise, shrimp noise, ship noise, croaker noise, unidentified biological noise, and combinations of these.

Statistical Analysis of Miami Area Ambient Noise Survey Data. H. B. Hoff and others. Columbia Univ. Div. of War Research Report D46A/R863. PB L 85547. 6 pp. (May, 1944). M $1.00; P $1.00.

Survey of Underwater Sound: Report No. 3. Ambient Noise. V. O. Knudsen et al. OSRD Report 4333. NDRC Report 6.1–1848. PB 31021. 236 pp. (Sept. 1944). M $5.00; P $16.00.

Masking Experiments. Report No. II. California Univ. Div. of War Research Report UCDWR U258. PB L 86493. 51 pp. (Sept. 1944). M $2.25; P $6.00. Various underwater sounds masked by typical ground noise.

Fish Noises. In order to study systematically the sounds made by fish, Dr. Christopher Coates of the New York Zoological Society Aquarium made oscillograms using an underwater microphone and a cathoderay oscilloscope. The most immediate application of these results is to aid the crews of sub chasers to distinguish fish noises from the sounds of submarines. Jl. Applied Phys. **16,** 188 (March, 1945).

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Ambient Noise Survey: Miami Area and the East Coast of the United States. Completion Report. H. B. Hoff and others. Columbia Univ. Div. of War Research Report D46A/R1215. PB L 85540. 52 pp. (May, 1945). M $2.25; P $6.00.

Measurements of Underwater Noise Produced by Marine Life. M. B. Dobrin. Science **105,** 19–23 (Jan. 3, 1947).

Ambient Water Noise in the Central and South Pacific. M. W. Johnson and T. F. Johnston. California Univ. Div. of War Research Report UCDWR M284. PB L 81338. 61 pp. (not dated). M $2.50; P $7.00.

Measurement of Underwater Noise Produced by Marine Life. M. B. Dobrin. PB L 66223. 1 p. (not dated). M $1.00; P $1.00. Abstract.

Underwater Noise Due to Marine Life. Donald P. Loye and Don A. Proudfoot. PB 28861. 14 pp. (not dated). M $1.00; P $1.00.

13.10 Sounds of Finite Amplitude in Water. Explosions. Distortions. Cavitation

Report on Underwater Explosions. E. H. Kennard. David W. Taylor Model Basin Report 480. PB L 81135. 51 pp. (Oct. 1941). M $2.25; P $6.00. A compact collection of what is known concerning certain practically important aspects of underwater explosions and their effects.

Photographic Studies of Shock Waves in Water. H. E. Edgerton and others. David W. Taylor Model Basin Report R 77. PB L 81157. 15 pp. (Nov. 1942). M $1.25; P $2.00.

Motion of a Pulsating Gas Globe under Water: A Photographic Study. D. C. Campbell. David W. Taylor Model Basin Report 512. PB L 81140. 63 pp. (May, 1943). M $2.50; P $7.00.

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13.10 Sounds of Finite Amplitude in Water. Explosions. Distortions. Cavitation (continued)
13.11 Instruments Relating to Underwater Sound. General

13.10 Sounds of Finite Amplitude in Water. Explosions. Distortions. Cavitation (continued)

Experiments in the Production and Photography of Intersecting Underwater Shock Waves. D. C. Campbell. David W. Taylor Model Basin Report R-203. PB L 81153. 10 pp. (Sept. 1943). M $1.00; P $1.00.

Radial Motion of Water Surrounding a Sphere of Gas in Relation to Pressure Waves. E. H. Kennard. David W. Taylor Model Basin Report 517. PB L 81141. 45 pp. (Sept. 1943). M $2.00; P $5.00. (a) Explosions. (b) The effect of bubbles in the water upon the propagation of pressure waves.

Small-Scale Underwater Explosions under Reduced Atmospheric Pressure. D. C. Campbell and C. W. Wyckoff. David W. Taylor Model Basin Report 520. PB L 81142. 34 pp. (Nov. 1943). M $1.75; P $4.00.

The Effect of a Pressure Wave on a Plate or Diaphragm. E. H. Kennard. David W. Taylor Model Basin Report 527. PB L 81144. 104 pp. (March, 1944). M $3.50; P $11.00.

Underwater Explosion Research. Progress Report. (a) Parts 6–9, (b) Parts 19–20, (c) Parts 21–23, (d) Parts 24-26. (a) H. E. Kennard and others, (b) W. P. Reep and others, (c) R. Specht and others, (d) G. E. Hudson and others. David W. Taylor Model Basin Reports R-244, R-265, R-279, and R-296. PB L 81150, PB L 81149, PB L 81147, and PB L 81145. 20 pp., 30 pp., 20 pp., and 39 pp. (April, July, Dec. 1944, and April, 1945). M $1.25; $1.50, $1.25, and $1.75; P $2.00, $3.00, $2,00, and $4.00.

A Study of the Surface Effects Caused by an Underwater Explosion. Part I. 1750 Pounds of Torpex Near the Bottom in 40 Feet of Water. H. E. Saunders and D. C. Campbell. David W. Taylor Model Basin Report R-252. PB L 80730. 16 pp. (July, 1944). M $1.00; P $2.00.

The Effect of an Air-Bubble Screen on Pressure Due to Underwater Explosions. J. J. Donoghue. David W. Taylor Model Basin Report R-177. PB L 81155. 27 pp. (August, 1944). M $1.50; P $3.00.

Tables and Graphs of the Theoretical Peak Pressures, Energies, and Impulses of Shock Waves from Explosive Sources in Sea Water. Stuart R. Brinkley, Jr. and John G. Kirkwood. OSRD Report 5649. NDRC Report A-342 PB 33254. 27 pp. (Oct. 1945). M $1.00; P $2.00.

Non-Linear Propagation of Underwater Shock Waves. M. F. M. Osborne and A. H. Taylor. Phys. Rev. **70,** 322–328 (Sept. 1946).

Selection of Adiabatic Parameters in the Theory of Oscillation of Gas Globes from Underwater Explosions. A. B. Arons. Phys. Rev. **73,** 1253 (May 15, 1948). Abstract.

13.11 Instruments Relating to Underwater Sound. General

Experiments on Underwater Supersonic Telephone in the Water Canal of a Power Plant. Junichi Saneyoshi and Norio Onodera. Imperial University, Dohoku. PB L 71560. 5 pp. (Jan. 1942). M $1.00; enlargement print $1.50. In Japanese. Abstract prepared at Wright Field, Dayton, Ohio.

Observations of Echo Signals Obtained Using Variable Frequency Transmission. Edwin M. McMillan. PB L 77756. 6 pp. (July, 1942). M $1.00; P $1.00.

Operating Instructions for Underwater Sound Level Meter and Analyzer. Columbia Univ. Div. of War Research Report G1/R117. PB L 63805. 20 pp. (Jan. 1943). M $1.00; P $2.00.

Low Frequency Calibration Technique for Underwater Sound Instruments. L. L. Foldy. OSRD Report 1184. NDRC Report 6.1–600. PN 31039. 31 pp. (Jan. 1943). M $1.00; P $3.00.

Measuring Tank Suitable for Acoustic Measurements in Water. Bell Telephone Labs. OSRD Report 1415. NDRC Report 6.1–836. PB 33384. 14 pp. (March, 1943). M $1.00; P $1.00.

Calibration of C-43 (AX-11) No. 4 Hydrophone. E. Gerjuoy. Columbia Univ. Div. of War Research Report D16/R261. PB L 81367. 2 pp. (April, 1943). M $1.00; P $1.00.

Sonic and Supersonic Tests Aboard Submarine USS S-16, May 28, 1943. Robert Y. Chapman. Columbia Univ. Div. of War Research Report D24/R373, NS113. PB L 81356. 3 pp. (June, 1943). M $1.00; P $1.00.

Calibration of OAY Sound Measuring Equipment No. 1 and General Radio Sound Level Meter Type 759, Model OR-1, Serial Number 9. W. T. Harris. Columbia Univ. Div. of War Research Report G7/R478. PB L 85529. 4 pp. (August, 1943). M $1.00; P $1.00. For underwater sound.

Listening Amplifier and Test Signal Generator Panel, Model 2A. U. S. Bureau of Ordnance. NAVORD Specification 2909. PB 37005. 13 pp. (Nov. 1943). M $1.00; P $1.00.

A Tourmaline Crystal Gage for Underwater Explosion Pressure. A. R. Cohen and B. Stiller. David W. Taylor Model Basin Report R-157. PB L 80731. 7 pp. (Dec. 1943). M $1.00; P $1.00.

Electrical Calibration of Model OAY Sound Measuring Equipment. D. P. Loye. Columbia Univ. Div. of War Research Report P35/R640. PN L 85535. 1 p. (Dec. 1943). M $1.00; P $1.00. See also Refs. 224, 225.

Improved Preamplifier Mounting for OAY Sound Level Meter Hydrophone. G. W. Archer. Columbia Univ. Div. of War Research Report P35/R679. PB L 85538. 8 pp. (Jan. 1944). M $1.00; P $1.00.

QC-BDI Rack Test Set. J. T. Kroenert. Columbia Univ. Div. of War Research Report D20/R771, NS 142. PB L 81373. 12 pp. (Feb. 1944). M $1.25; P $2.00. A combination oscillator and vacuum tube voltmeter amplifier unit to be housed in the model 5C Harvard Sound Gear Monitor Case.

Description of the Equipment Used in the Measurement of Underwater Acoustic Transients. E. C. Gregg, Jr. OSRD Report 4515. NDRC Report 6.1–1978. PB 31012. 15 pp. (Dec. 1944). M $1.00; P $1.00.

Echo-Repeater Calibrator. Completion Report. F. V. Hunt. OSRD 6.1-SR287–2068. PB L 86130. 61 pp. (August, 1945). M $2.50; P $7.00.

The Sonobuoy. Electronics **19,** 154–155 (April, 1946). Sci. Abstr. **A50,** 3457 (Dec. 1947).

An Acoustic Lens for Underwater Sound. Robert Herr. Mass. Inst. Technol. Acoustics Lab. Techn. Memo. No. 9 (Oct. 25, 1946).

The Design and Construction of an Electronic Gate System for Underwater Acoustics Measurements. G. F. Breitwieser. Mass. Inst. Technol. Acoustics Lab. Paper No. 28 (May 23, 1947). M.S. thesis in E.E.

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13.11 Instruments Relating to Underwater Sound. General (continued)

An Acoustic Interferometer for the Measurement of Sound Velocity in the Ocean. R. J. Urick. Phys. Rev. **72,** 746 (Oct. 15, 1947). Abstract.

Depth Sounder. Trident Products, Inc., Burbank, California. Sci. Amer. **178,** 180–181 (April, 1948). All-electronic, measures depths from zero to 600 feet.

An Acoustic Screen for Making Underwater Noise Reduction Tests in Pearl Harbor. Donald P. Loye and Wm. Fred Arndt. PB L 86764. 8 pp. (not dated). M $1.00; P $1.00.

13.11n Navigational Instruments Using Underwater Sound. Underwater Listening and Echo Ranging Devices. Sonar

Instructions for Echo Sounding Systems Models NG and NG-1. E. B. Stephenson. Naval Research Lab. RA 55A 224. PB 17758. 27 pp. (March, 1934).

Instructions for Navy Model NM-3 Under-Water Echo Sounding Equipment. Radio Corp. of Am. Victor Company, Inc. Instruction book 23915–1. PB 17834. 79 pp. (May, 1934).

Installation, Operation, and Maintenance Instructions for Several Models of Underwater Transmitting and Receiving Equipment. U. S. Navy Dept. Bureau of Ships. PB 17914, 55 pp. (1934); 17915, 89 pp. (1943); 17916, 93 pp. (not dated); 17917, 46 pp. (1943); 17918, 42 pp. (1942).

Installation, Operation, and Maintenance Instructions for Various Models of Echo Ranging Equipment. U. S. Navy Dept. Bureau of Engng. PB 17747, 204 pp. (1937); 18065, 62 pp. (1934); 18066, 154 pp. (1934); 18068, 136 pp. (1934); 18069, 117 pp. (1938); 18070, 236 pp. (1936).

Sonar Defeated Subs. The Navy reveals the story of the battle against undersea raiders. Sci. News Letter **49,** 231 (April 13, 1936).

Installation, Operation, and Maintenance Instructions for Models QMC-3, QCN-2, and QCO-1 Echo Ranging-Listening Equipment, and Model JKA-1 Sound Listening Equipment. U. S. Bureau of Ships. PB 38115 and 38116. 271 pp. and 337 pp. (April, 1938; Dec. 1939). M $6.00 and $7.00; P $19.00 and $23.00.

Installation, Operation, and Maintenance Instructions for Model WAB Echo Sounding-Ranging Equipments . . . for U.S.S. Noa (DD **343**). U. S. Bureau of Ships. PB 38124. 364 pp. (Nov. 1938). M $8.00; P $25.00.

Installation, Operation, and Maintenance Instructions for Power Training Control for Use as Part of Echo Ranging and Sound Listening Equipment. U. S. Navy Dept. Bureau of Engng. PB 17882. 85 pp. (April, 1939).

Ears under Water; Anti-Submarine Warfare. Time **34,** 66 (Oct. 9, 1939).

Frequency Sweep Modulator Instructions for Type CRV-78091 for Use with Model QC (series) Echo Ranging Equipment. RCA Manufacturing Co. RCA No. IB-38023. PB 18067. 11 pp. (1939).

Preliminary Operating Instructions for Models NM-14B and NM-14C Echo Sounding Equipment. U. S. Bureau of Ships. PB 26968. 37 pp. (March, 1940). M $1.00; P $3.00.

Actual Research on Direct-Reading Depth-Meter at Shiogama Harbour. S. Matsuo. Electrotech. Journ. (Tokyo) **4,** 255–257 (Nov. 1940); Wireless Engineer **19,** 1096A (1942).

Preliminary Installation, Operation, and Maintenance Instructions for Model NK-1 Portable Echo Sounding Recorder Equipment. U. S. Bureau of Ships. PB 38117. 24 pp. (Dec. 1940). M $1.00; P $2.00. This equipment automatically records ocean depths in feet where the depth does not exceed 200 feet.

A New Application of Echo-Sounding. C. H. Mortimer and E. B. Worthington. Nature **145,** 212–214 (1940).

Instruction Books for Various Models of Sono-Radio-Buoy Transmitting and Receiving Equipment. U. S. Navy Dept. Bureau of Ships. PB 17829, 48 pp. (1940); 17878, 125 pp. (1942); 17881, 113 pp. (1943); 17971, 161 pp. (1942); 17994, 138 pp. (1941).

Installation, Operation, and Maintenance Instructions for Model WEA Echo Ranging/Listening Equipment. Radio Corp. of Am., RCA Victor Div. Instruction Book 38113. PB 17933. 160 pp. (March, 1941).

Echo Ranging — Suggested Refinements. H. Nyquist. PB 33394. 4 pp. (August, 1941). M $1.00; P $1.00.

Submarine Detection — Low Frequency Sound Waves. H. Nyquist. PB 32568. 7 pp. (Oct. 1941). M $1.00; P $1.00.

Submarine Detection — Aural *vs.* Automatic Reception. H. Nyquist. PB 33393. 4 pp. (Dec. 1941). M $1.00; P $1.00.

Acoustic Measurements in Water (Memorandum for Dr. Kingdon). Woods Hole Oceanographic Institution. PB 33386. 6 pp. (Dec. 1941). M $1.00; P $1.00. Considers possible performance of a towed projector which could also serve as a listening device.

Acoustic Echo Devices and Other Detectors for Controlled Submarine Mines. Progress Report. Mass. Inst. Techn. NDRC Report D–3–202. PB 32608. 23 pp. (March, 1942). M $1.00; P $2.00.

Acoustic Echo Devices and Other Acoustic Detectors for Controlled Submarine Mines. Progress Report. Mass. Inst. Techn. NDRC Report D–3–202. PB 32608. 23 pp. (March, 1942). M $1.00; P $2.00.

Deep and Shallow Water Listening near Key West and San Diego during October, 1942. D. P. Loye. Columbia Univ. Div. of War Research Memo. G1/R113. PB L 62666. 5 pp. (Nov. 1942). M $1.00; P $1.00.

Operation, Use, and Maintenance of Topside Sonic Listening Equipment for Submarines, Model D-24, Mark II. Columbia Univ. Div. of War Research Report D24/R123. PB L 67705. 40 pp. (Dec. 1942). M $1.00; P $3.00.

Through-the-Hull Mounted Listening Equipment. Report on Conference, Dec. 9, 1942. W. B. Snow. Columbia Univ. Div. of War Research Report D38/R125. PB 53953. 2 pp. (Dec. 1942). M $1.00; P $1.00. The three-foot line hydrophone on the through-the-hull mounting at least duplicates the range of the toroid hydrophone on the overside gear, and gives sharper bearing.

Installation, Operation, and Maintenance Instructions for Various Models of Herald Equipment. U. S. Navy Dept Bureau of Ships. PB 17746, 17852, 17866, 17870, 17991 213 pp., 193 pp., 193 pp., 325 pp., 343 pp. (1942–1944). Th

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Herald equipment is designed to determine the range and azimuth of surface and under-surface vessels by means of a supersonic beam.

Binaural Listening System. Interim Report. D. P. Loye. Columbia Univ. Div. of War Research Report P12/R145. PB L 67626. 10 pp. (Jan. 1943). M $1.00; P $1.00. For underwater sounds.

Expendible Radio-Sonic Buoy, Model D16, Mark IV E. Specification. Columbia Univ. Div. of War Research Report D16/R160. PB L 60309. 111 pp. (Feb. 1943). M $3.00; P $8.00.

Measurements on the Characteristics of the JN Sound Gear. E. Gerjuoy. Columbia Univ. Div. of War Research Memo. G12/R208. PB L 67700. 8 pp. (March, 1943). M $1.00; P $1.00. A hydrophone with three different shields.

Modification of Line Supply for Sonic Receiver Amplifier Submarine Installation. R. Y. Chapman. Columbia Univ. Div. of War Research Memo. D24/R201. PB L 67698. 5 pp. (March, 1943). M $1.00; P $1.00. Eliminates electric interference originating within the ship.

Primary Listening Teacher. Henry E. Hartig and George A. Brettell, Jr. Calif. Univ. Div. of War Research Report UCDWR U57. OSRD Report 1458. NDRC Report 6.1–672. PB 40620. 15 pp. (April, 1943). M $1.00; P $1.00. Produces artificial water noise and propeller noise, and gives the sonar student practice in searching for and in distinguishing screw noise, in taking bearings, in counting propeller beats, and in announcing the results of his observations.

Installation of Topside Sonic Listening Equipment on "P" Class Submarines. Robert Y. Chapman. Columbia Univ. Div. of War Research Report D24/R232. PB L 81351. 18 pp. (April, 1943). M $1.25; P $2.00.

Through-the-Hull Sonic Listening Equipment. E. E. Teal. Columbia Univ. Div. of War Research Memo. D38/R155. PB L 67703. 25 pp. (April, 1943). M $1.00; P $2.00.

Topside Listening Gear. W. B. Snow. Columbia Univ. Div. of War Research Report D24/R252. PB L 81347. 3 pp. (April, 1943). M $1.00; P $1.00.

Automatic Volume Control for Echo-Ranging Equipments; Pros and Cons. R. G. Stephenson. Columbia Univ. Div. of War Research Report D20/R312. PB L 81204. 3 pp. (May, 1943). M $1.00; P $1.00.

Harvard Demonstrations, May 26, 1943, and Conferences with Lieut. Comdr. Bennett, II. C. R. Sawyer. Columbia Univ. Div. of War Research Report D20/D43/R399. PB L 81206. 4 pp. (May, 1943). M $1.00; P $1.00. Deals especially with certain echo-ranging systems.

Sonic and Supersonic Tests Aboard Submarine USS S-20, May 8, 1943. D. P. Loye and others. Columbia Univ. Div. of War Research Report D24/R360. PB L 81353. 7 pp. (May, 1943). M $1.00; P $1.00.

Supersonic Listening Tests Aboard USS S-20, May 22, 1943. D. P. Loye and others. Columbia Univ. Div. of War Research Report D24/R368. PB L 81355. 2 pp. (May, 1943) M $1.00; P $1.00.

Conference on Supersonic Listening Converter. W. B. Snow. Columbia Univ. Div. of War Research Report D24/R382. PB L 81354. 2 pp. (June, 1943). M $1.00; P $1.00.

Elimination of Background Noise in the Mark II Serial No. 4 Rack. Wm. Fred. Arndt. Columbia Univ. Div. of War Research Memo. D20/R379. PB L 80885. 3 pp. (June, 1943). M $1.00; P $1.00. Is part of echo ranging equipment. Supplement to above Memo. PB L 80884. 1 p. (June, 1943). M $1.00; P $1.00.

Testing Means for QC Echo-Ranging Indicator-Amplifier-Control Units being Manufactured by the Submarine Signal Company and the RCA Manufacturing Company. Wm. Fred. Arndt. Columbia Univ. Div. of War Research Memo. D43/D20/R392. PB L 80889. 4 pp. (June, 1943). M $1.00; P $1.00.

Chemical Recorder Range Scale for Use with Mark II Echo Ranging Equipment. H. I. Hultgren. Columbia Univ. Div. of War Research Report D20/R451. PB L 81202. 5 pp. (July, 1943). M $1.00; P $1.00.

CRO Range Scale for Use with Mark II Echo-Ranging Equipment. H. I. Hultgren. Columbia Univ. Div. of War Research Report D20/R452. PB L 81380. 10 pp. (July, 1943). M $1.00; P $1.00.

Improved Echo Ranging Equipment (USS Sylph). Columbia Univ. Div. of War Research Report D20/R425. PB L 81203. 3 pp. (July, 1943). M $1.00; P $1.00.

Preliminary Installation and Operation Manual for MTB Modification of Thyratron Training Control System. Columbia Univ. Div. of War Research Report D40/R461. PB L 81341. 75 pp. (August, 1943). M $2.75; P $8.00. For Submarine Signal Company's echo ranging equipment.

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13.11n Navigational Instruments Using Underwater Sound. Underwater Listening and Echo Ranging Devices. Sonar (continued)

13.11n Navigational Instruments Using Underwater Sound. Underwater Listening and Echo Ranging Devices. Sonar (continued)

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13.11t Transducers for Underwater Sound. Transducer Calibration

13.11n Navigational Instruments Using Underwater Sound. Underwater Listening and Echo Ranging Devices. Sonar (continued)

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13.11t Transducers for Underwater Sound. Transducer Calibration

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INVENTOR INDEX TO ACOUSTICAL PATENTS

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2,417,347. Vibration damper. Thomas T. Brown. 19: 714.
2,241,837. Damping means. Alfred L. W. Williams and Joseph J. Neff. 13: 198.
2,422,683. Rubber mounting. Gustav H. Kaemmerling. 20: 78.
2,425,565. Vibration absorption unit. Cecil S. Robinson. 20: 78.
2,425,566. Vibration absorption block. Cecil S. Robinson. 20: 79.
2,425,567. Vibration absorption device. Cecil S. Robinson. 20: 79.
2,425,654. Vibration dampening device. Harold A. Storch. 20: 79.
2,428,293. Vibration absorbing mount. Cecil S. Robinson. 20: 569.
2,432,050. Energy dissipating antivibration device. Leon F. Thiry. 20: 569.

2.12 Damping of Panels

2,337,525. Sound Deadener. Paul G. Peik. 16: 216.
2,341,305. Sound deadening wall construction. Carroll L. Woodworth. 16: 216.
2,355,568. Vibration damped panel. Frank M. Smith. 16: 286.
2,386,502. Sound deadener. Paul G. Peik. 18: 513.
2,424,004. Sound deadener. Oliver Clark Terrell. 20: 570.

4. The Ear and Hearing

4.5 Instruments Relating to Hearing, and for the Testing of Hearing (see also 5.5)

Re. 22,499. Bone conduction hearing-aid. Hugo Lieber. 16: 286.
Re. 22,658. Bone conduction audiphone. Henry Koch. 17: 306.
2,207,705. Hearing aid device. John Walter Cox. 12: 458.
2,217,394. Method and apparatus for testing hearing. Arthur M. Wengel. 12: 458.
2,224,974. Sound transmitter. Samuel F. Lybarger. 12: 538.
2,225,597. Hearing aid amplifier. Dean Babbitt and Hermann Scheibler. 12: 538.
2,230,397. Acoustic apparatus for the deaf. Lewis Abraham. 12: 538.
2,230,499 and 2,230,500. Bone conduction receivers. Samuel F. Lybarger. 12: 538.
2,230,738. Eardrum protector. Edward Baum. 12: 538.
2,232,799. Method for testing bone conduction. Harvey Fletcher. 13: 76.
2,235,733. Auditory masking method. Edward G. Witting. 13: 77.
2,239,550. Bone conduction hearing device. Joseph R. Cubert. 13: 76.
2,241,093. Hearing aid. Hugo Lieber. 13: 198.
2,246,736. Ear stopper. Vern O. Knudsen. 13: 199.
2,246,737. Ear stopper. Vern O. Knudsen. 13: 199.
2,248,837. Custom-made hearing aid receiver tip. Frank D.F. Walters. 13: 199.
2,249,572. Earable bone-conduction hearing aid. Hugo Lieber. 13: 199.
2,257,262. Audiometer. Heiman W. Koren. 13: 327.
2,257,263. Audiometer. Heiman W. Koren. 12: 538.
2,257,840. Hearing aid amplifier. William Dubilier. 13: 327.
2,258,638. Bone conduction audiphone. William A. Zarth. 13: 400.
2,261,979. Acoustic device. Dante Domizi. 13: 400.
2,262,082. Bone conduction audiophone. William A. Zarth. 13: 400.
2,262,568. Ear protector. Kenneth L. Wade. 13: 401.
2,264,684. Bone telephone receiver. William T. Weidenman. 13: 401.
2,266,669. Hearing aid device. Arthur M. Wengel. 13: 401.
2,266,788. Hearing aid device. John B. Nelson and Willard C. Mason. 13: 401.
2,280,305. Volume control for hearing aids. Walter E. Schauer. 14: 123.
2,291,942. Bone conduction hearing aid. Samuel J. A. M. Bagno. 14: 198.
2,308,550. Amplifying hearing aid. Harry B. Shapiro. 15: 142.
2,312,534. Acoustic device. Henry D. Fiene. 15: 142.
2,319,627. System and apparatus for sound reception. Sol Perlman. 15: 142.
2,321,370. Hearing aid system. William Dubilier. 15: 143.
2,325,590. Earphone. Richard W. Carlisle and Alfred J. Mastropoie. 15: 195.
2,327,320. Amplifying hearing aid. Harry B. Shapiro. 15: 232.
2,327,321. Hearing aid amplifier. Harry B. Shapiro. 15: 233.
2,336,669. Earphone support and silencer cup. Ray W. Brown and Robert Iredell. 16: 84.

4.5 Instruments Relating to Hearing, and for the Testing of Hearing (see also 5.5) (continued)

2,336,828. Portable microphone and amplifier. William A. Zarth. 16: 85.
2,339,148. Bone conduction receiver. Richard W. Carlisle. 16: 85.
2,339,173. Bone conduction receiver. Heiman W. Koren. 16: 85.
2,344,023. Earphone. Richard W. Carlisle. 16: 216.
2,361,963. Acoustic guard. Maurice C. Rosenblatt. 17: 92
2,367,726. Sound transmitter. Samuel F. Lybarger. 17: 92.
2,371,819. Sound reproducing unit and method for making the same. Gilbert E. Gustafson. 17: 307.
2,371,820. Method for making sound reproducing units. Gilbert E. Gustafson. 17: 307.
2,377,739. Hearing aid. Roger W. Wyckoff. 17: 307.
2,390,243. Hearing aid device. Frank J. Faltico. 18: 513.
2,391,924. Phone and method of making same. Donald E. Rutter, Harry B. Shapiro, and Walter J. Brown. 19: 389.
2,393,184. Tone control. Edward B. Passow. 18: 235.
2,393,340. Applicator for ear protectors. Elwyn Stanton Russell. 18: 235.
2,394,569. Fitting hearing aid device. Einar A. Strommen. 18: 235.
2,395,318. Hearing aid. Joseph R. Cubert. 18: 235.
2,399,513. Piezoelectric transducer. Harry B. Shapiro. 19: 519.
2,402,480. Bone-conduction audiphone. William A. Zarth. 19: 935.
2,403,418. Earphone socket. John Volkmann. 19: 389.
2,405,433. Bone conduction audiphone. Henry Koch. 19:389.
2,406,583. Portable apparatus. Ralph C. Blauvelt. 19: 389.
2,409,481. Combined hearing aid and radio receiving set. Thomas B. Fordham and Thomas W. Moore. 19: 519.
2,423,355. Earphone socket structure. Paul S. Veneklasen. 20: 214.
2,424,422. Hearing aid apparatus. Raleigh E. Tresise and Paul D. Kendall. 19: 1002.
2,430,229. Hearing aid earpiece. Elizabeth L. Kelsen. 20: 214.

5. Applied Acoustics, Instruments and Apparatus

5.1 General, Unclassified

2,247,111. Acoustical projectile. John C. Batchelor and Frederick A. Lindley, Jr. 13: 199.
2,256,925. Noise making tube. Curtiss J. McCoy. 13: 327.
2,257,859. Method and apparatus for recording waves. Esme E. Rosaire and Fabian M. Kannenstine. 13: 328.
2,263,233. Acoustic apparatus. Werner Burck. 13: 401.
2,305,943. Electrically operated vibratory apparatus. Carl S. Weyandt. 15: 196.
2,314,260. Siren. Evan D. Williamson. 15: 196.
2,317,458. Wind sounding device. George L. Herter. 15:196.
2,324,305. Sound stroboscope. Lowell M. Kurtz. 15: 196.
2,328,169. Means for instructing by histophonetics. Erwin I. Schinler. 15: 233.
2,333,515. Chime. Robert B. Brewer and Lawrence G. Gergeron. 16: 85.
2,333,875. Chime unit. Carlton L. McMullen. 16: 85.
2,350,390. Horn control system. Robert M. Critchfield, Paul L. Schneider, and Brooks H. Short. 16: 217.
2,354,684. Siren. Robert C. Jones, Horace T. O'Neil, and Edward C. Wente. 16: 286.
2,363,686. Acoustic Stethoscope. Harry F. Olson. 17: 93.
2,367,233. Siren. Frederick C. Millard. 17: 93.
2,371,949. Acoustic alarm device. Sven Agne Bjergel. 17: 158.
2,372,968. Sound generator. Arthur G. B. Metcalf. 17: 307.
2,375,004. Training apparatus. Hugh S. Knowles. 17: 307.
2,386,513. Steam whistle. Sten Soderberg. 17: 366.
2,388,531. Low frequency signaling. Harmon B. Deal. 17: 366.
2,391,669. Signaling device. Albert D. Baker. 17: 367.
2,391,698. Musical signal. Alexis C. Grohsgal. 17: 367.
2,393,885. Electroacoustic binaural listening system. Frederic S. Claassen. 18: 513.
2,401,411. Frequency-response testing system. Samuel F. Carlisle, Jr. and August B. Mundel. 19: 1002.
2,401,955. Electrical control system. Harry F. Olson and Frank Hester. 19: 715.
2,406,859. Communication in pipe lines. Edward W. Smith. 20: 214.
2,407,299. Communication in pipe lines. Edward W. Smith. 20: 214.
2,409,131. Siren for aircraft. William P. Lear. 20: 356.
2,410,454. Voice-transmitting gas mask. Armand V. Motsinger. 20: 357.
2,412,240. Method and means for testing for imperfections in vibratable objects. Frank W. Williams and James Clark. 20: 357.
2,419,099. Traffic recorder. Alexander C. Wall. 20: 571.
2,421,182. Stroboscope. Robert T. Bayne. 20: 572.
2,424,216. Control system for radio receivers. Carl Edward Atkins. 20: 570.

5.2 Amplifiers and Attenuators

2,434,908. Thermionic amplifier. Prafulla Kumar Chatterjea and Charles Thomas Scully. 20: 571.

5.3 Acoustical and Mechanical Impedance Measurement (see also 11.4)

2,355,194. Mechanical impedance measuring device. Alpha M. Wiggins. 16: 287.
2,394,455. Method of and means for measuring mechanical impedance. Winfield R. Koch. 19: 278.

5.4 Analyzers and Filters, Mechanical and Electrical. Acoustic Filters. Oscillographs (see also 5.15)

2,340,714. Method and apparatus for sound analysis. Alfred E. Traver and Carl E. Habermann. 16: 86.
2,342,813. Mechanical wave filter. Warren P. Mason. 16: 86.
2,342,869. Wave filter. Thomas G. Kinsley. 16: 86.
2,345,491. Wave transmission network. Warren P. Mason. 16: 217.
2,361,990. Vibration analyzer. William J. Brown. 17: 93.
2,377,242. Apparatus for analyzing wave bands. Earle L. Kent. 17: 308.
2,403,982. Analysis and representation of complex waves. Walter Koenig, Jr. 19: 1003.
2,403,983. Representation of complex waves. Walter Koenig, Jr. 19: 1003.
2,403,984. Representation of complex waves. Walter Koenig, and Alfred Ruppel. 19: 1003.

5.4 Analyzers and Filters, Mechanical and Electrical. Acoustic Filters. Oscillographs (see also 5.15) (continued)

2,403,985. Sound reproduction. Walter Koenig, Jr. 19: 1004.
2,403,986. Wave translation. Lester Y. Lacy. 19: 1004.
2,403,996. Electron discharge apparatus. Ralph K. Potter. 19: 1005.
2,403,997. Representation of complex waves. Ralph K. Potter. 19: 1005.
2,423,459. Frequency selective apparatus. Warren P. Mason. 20: 720.
2,425,003. Analysis and representation of complex waves. Ralph K. Potter. 20: 720.
2,429,229. Analysis and representation of complex waves. Walter Koenig, Jr. 20: 888.
2,429,236. Analysis and representation of complex waves. Ralph K. Potter. 20: 721.
2,432,123. Translation of visual symbols. Ralph K. Potter. 20: 888.

5.5 Audiometers (see also 4.4 and 4.5)

Re. 21,735. Audiometer. Walter H. Huth and Joseph R. Cubert. 13: 77.
2,229,206. Audiometer. John R. Cubert. 12: 538.
2,257,262. Audiometer. Heiman W. Koren. 12: 538.
2,257,263. Audiometer. Heiman W. Koren. 12: 538.

5.5.1 Broadcasting

2,403,231. Reverberations modulator. Maurice Parisier. 19: 715.
2,403,232. Reverberation modulator for echo effect. Maurice Parisier. 19: 715.

5.7 Frequency Standards, Frequency Measuring and Recording Instruments

2,238,668. Device for the production of sound vibrations of definite frequency by means of a pipe or whistle. Robert Wellenstein. 13: 77.
2,258,638. Bone conduction audiphone. William A. Zarth. 13: 401.
2,258,743. Stethoscope. Albert Dax. 13: 401.
2,260,210. Visual tip for vibrating indicators. Roland B. Bourne. 13: 401.
2,260,847. Vibratory frequency standard. Henry E. Warren. 13: 401.
2,260,848. Vibratory frequency standard. Henry E. Warren. 13: 402.
2,261,979. Acoustic device. Dante Domizi. 13: 402.
2,271,467. Three-tone stethoscope. Jacob Smithline. 14:123.
2,286,030. Stroboscope. R. W. Young and Allen Loomis. 14: 198.
2,295,902. Tuning device. Samuel M. Kass. 15: 67.
2,296,777. Tonoscope. Carey F. Elton. 14: 198.
2,303,234. Vibratory instrument. Gerhard W. Schwarzkopf and Thomas Barclay Whitson. 15: 143.
2,320,080. Piezoelectric crystal element. Stuart C. Hight. 15: 143.
2,346,984. Rate control for tuning fork oscillators. Milton S. Mead, Jr. 16: 217.
2,403,809. Frequency meter. Frederick J. Lingel. 20: 79.
2,403,958. Wave producing and wave frequency-measuring device. Stuart W. Seeley. 19: 1006.
2,415,215. Stroboscopic tuning apparatus. John H. Mayberry. 20: 357.
2,425,811. Apparatus for measuring voltages. Earle L. Kent. 20: 889.
2,426,721. Stroboscopic cathode-ray oscilloscope system for comparing two frequencies. Robert T. Adams. 20: 889.
2,429,427. Frequency controlled frequency meter. Frank Rieber. 20: 889.

5.8 Loudspeakers, Horns (see also 5.13 and 5.17)

2,259,907. Sound reproducing system. Benjamin Olney. 13: 402.
2,260,063. Loudspeaker. John McWilliams Stone and Carleton T. Weibler. 13: 402.
2,261,110. Loudspeaker. Bernard A. Engholm. 13: 402.
2,261,111. Loudspeaker. Bernard A. Engholm. 13: 402.
2,281,539. Horn. Lyndon V. Grover. 14: 123.
2,286,123. Electromagnetic transducer. William F. Steers. 14: 199.
2,288,607. Pneumatically operated loudspeaker. Edward F. Chandler. 14: 244.
2,288,832. Fibrous acoustic diaphragm. Victor T. Pare. 14: 244.
2,290,968. Loudspeaker. Leopold Igluck. 14: 199.
2,291,108. Selective electro-acoustical transducer. Edward M. Sargent and Lyndon C. Rayment. 14: 244.
2,291,459. Loudspeaker. Stewart P. Foltz and Raymond B. Peterson. 14: 245.
2,292,424. Acoustic device. Alexander I. Abrahams. 15: 67.
2,293,181. Sound absorbing apparatus. Frederick E. Terman. 14: 244.
2,295,483. Loudspeaker. Hugh S. Knowles. 14: 199.
2,295,527. Electrodynamic and electro-acoustical apparatus. Raymond E. Bowley. 14: 199.
2,297,218. Loudspeaker. Hans E. Henrich and Oskar Vierling. 14: 245.
2,297,972. Sound reproducing device. Bert E. Mills. 14: 245.
2,301,459. Electric megaphone. Arthur J. Sanial. 15: 67.
2,302,178. Acoustic diaphragm. Joseph B. Brennan. 15: 67.
2,303,989. Signal translating apparatus. David H. Cunningham. 14: 245.
2,304,022. Sound reproducing apparatus. Royden C. Sanders, Jr. 15: 68.
2,306,291. Method of assembling the magnet system for acoustic devices. Luitje Alons. 15: 68.
2,310,243. Horn for loudspeakers. Paul W. Klipsch. 15: 68.
2,315,896. Radio speaker unit support. Ellsworth O. Dumas. 15: 143.
2,318,517. Loudspeaker. Harry F. Olson. 15: 143.
2,320,402. Loudspeaker. Gregory W. Blessing. 15: 233.
2,328,836. Loudspeaker and circuit therefor. John J. Moynihan. 15: 202.
2,329,560. Acoustic device. John D. Seabert. 15: 202.
2,337,213. Pressure control loudspeaker enclosure. Joseph Topping, Jr. 15: 233.
2,337,839. Acoustical device. Harry N. Rider. 15: 233.
2,338,262. Acoustic horn. Vincent Salmon. 15: 234.
2,341,275. Sound reproducing instrument. Glen Holland. 16: 131.
2,347,799. Loudspeaker. Alexander Schaaf. 16: 217.
2,351,690. Electric horn. Oliver Lucas. 16: 217.

5.8 Loudspeakers, Horns (see also 5.13 and 5.17) (continued)

2,352,602. Electric horn. E. H. Church. 16: 217.
2,358,823. Elliptical cone-shaped reproduction diaphragm. Richard A. O'Connor and La Vern Edward Quinnell. 16: 287.
2,359,348. Sound distributor for sound reproducers. Spencer H. Barclay. 16: 288.
2,364,485. Acoustical device. Charles B. Spencer. 17: 93.
2,367,026. Electrodynamic speaker. William H. Hutter. 17: 159.
2,368,639. Tone chamber. Frank C. Carter. 17: 159.
2,370,939. Sound-emitting device. Lawrence J. Cooney. 17: 308.
2,371,951. Double diaphragm loudspeaker. Ellsworth D. Cook. 17: 159.
2,371,960. Sound producing device. William C. Eaves. 17: 160.
2,372,956. Feed-back circuit. Stanley R. Jordan. 17: 160.
2,373,172. Muffler, for intercommunicating system units. William Sinkler Darby. 17: 160.
2,373,692. Loudspeaker. Paul W. Klipsch. 17: 160.
2,380,869. Loudspeaker. James P. Quam. 17: 308.
2,381,174. Communication system. Frank Massa. 18: 236.
2,384,371. Sound reproducing and amplifying device. Charles F. Dilks. 18: 236.
2,384,958. Method of and apparatus for making fibrous articles. Victor T. Pare. 18: 236.
2,386,996. Sound translating apparatus. Alfred L. W. Williams. 18: 237.
2,390,834. Horn loudspeaker. Joseph Hegener. 18: 514.
2,392,143. Loud-speaker. Maxim L. Graham. 19: 278.
2,402,697. High frequency vibrator. Edwin E. Turner, Jr. 19: 715.
2,426,928. Cabinet for sound-reproducing devices. Paul M. Gazlay. 20: 721.
2,426,948. Coaxial dual-unit electrodynamic loud-speakers. John Preston. 20: 889.
2,427,844. Vibratory unit for electrodynamic loud-speakers. David Eklov. 20: 890.
2,428,269. Pneumatic sound producing device. William C. Eaves. 20: 890.

5.9 Microphones. Vibration Microphones. Microphone Calibration Equipment (see also 13.11t)

2,228,499. Apparatus for the vibration testing of articles. F. Allendorf. 12: 539.
2,228,886. Electroacoustical apparatus. Harry F. Olson. 12: 539.
2,247,663. Electroacoustical apparatus. Harry F. Olson. 13: 200.
2,251,436. Vibration measuring and recording apparatus. George P. Bentley and Charles S. Draper. 13: 200.
2,259,511. Microphone. George Baldwin Banks. 13: 403.
2,260,727. Contact microphone. Sterling G. Sears and William T. Weiderman. 13: 403.
2,262,146. Sound translation apparatus. Frank Massa. 13: 403.
2,262,295. Vibration meter. Charles D. Greentree. 13: 403.
2,271,988. Electroacoustical apparatus. Harry F. Olson. 14: 123.
2,282,319. Leakage reducing means. Walter J. Brown. 14: 245.
2,284,039. Reproduction of sound. William A. Bruno. 14: 200.
2,286,897. Vibration pick-up. Philip J. Costa and George E. Holback. 14: 246.
2,287,950. Piezoelectric device. Raymond W. Tibbetts. 14: 200.
2,288,600. Electrical device. John P. Arndt, Jr. 14: 200.
2,288,838. Vibration pick-up device. Eugene W. Pike and Arthur W. Vance. 14: 200.
2,288,839. Sound translating device. Harold C. Pye. 14: 201.
2,289,954. Leakage reducing means. John P. Arndt., Jr. 14: 201.
2,293,078. Microphone. Barton A. Proctor. 14: 246.
2,293,258. Acoustic device. William R. Harry. 14: 201.
2,295,376. Electroacoustical apparatus. Leslie J. Anderson. 14: 246.
2,299,081. Vibration measuring appparatus. Charles S. Draper. 15: 144.
2,299,342. Electroacoustical apparatus. Harry F. Olson. 15: 144.
2,301,638. Sound translating apparatus. Harry F. Olson. 15: 68.
2,301,744. Electroacoustical signal translating apparatus. Harry F. Olson. 15: 68.
2,305,596. Conversion of wave motion into electrical energy. Benjamin B. Bauer. 15: 68.
2,305,597. Conversion of wave motion into electrical energy. Benjamin B. Bauer. 15: 69.
2,305,598. Conversion of wave motion into electrical energy. Benjamin B. Bauer. 15: 69.
2,305,599. Conversion of wave motion into electrical energy. Benjamin B. Bauer. 15: 69.
2,305,626. Electroacoustic apparatus. Royal Lee. 15: 69.
2,314,938. Signal translating device. James R. Haynes. 15: 144.
2,320,433. Telephone transmitter. Alfred Herckmans. 15: 202.
2,325,117. Vibration translating device. George J. V. Faley. 15: 203.
2,325,424. Windshield for microphones. Michael Rettinger. 15: 203.
2,325,688. Sound translating apparatus. Daniel O. Landis. 15: 203.
2,331,044. Sound translating device. Harold C. Pye. 16: 86.
2,338,909. Electromagnetic oscillating device with freely oscillating armature. Carl Ernst Eichhorn. 16: 86.
2,340,777. Throat microphone. Harvey H. Stanley. 16: 87.
2,345,078. Carbon microphone. Albert Ueberschuss. 16: 87.
2,345,996. Signal translating apparatus. Leslie J. Anderson and Alfred H. Kettler. 16: 132.
2,346,226. Protective cover for apertures for loudspeaking instruments, microphones, and other articles. Dennis Herbert Marlow. 16: 132.
2,346,394. Sound pick-up apparatus. Michael Rettinger. 16: 132.
2,346,395. Sound pick-up device. Michael Rettinger. 16: 218.
2,346,429. Sound reproducing and receiving device. Frank Harrison. 16: 218.
2,348,356. Microphone. Harry F. Olson. 16: 218.
2,350,010. Microphone. Francis Cheyney Beekley. 16: 219.
2,351,400. Microphone. Richard W. Carlisle. 16: 288.
2,351,904. Translator. Jesse Ora Ballinger and Edward B. Worthington. 16: 219.
2,352,305. Microphone. Leslie J. Anderson. 16: 288.
2,353,089. Transducer. Harry B. Shapiro. 17: 94.

5.9 Microphones. Vibration Microphones. Microphone Calibration Equipment (see also 13.11t) (continued)

2,354,021. Transmitter. Albert F. Horlacher. 16: 219.
2,358,099. Tone control for transmitters. Robert E. Polk. 16: 289.
2,361,458. Microphone for conduits. Lynn C. Converse. 17: 94.
2,361,656. Microphone device. Ernest William Rogers. 16: 289.
2,368,609. Electroacoustic transducer. Ernst Burkhardt. 17: 161.
2,379,514. Microphone. Charles B. Fisher. 17: 309.
2,385,279. Distant talking loud-speaker telephone system. Harris F. Hopkins. 18: 237.
2,385,867. Throat microphone. Jacob M. Kuhlik. 17: 368.
2,386,657. Amplifying transmitter. William P. Carstarphen. 17: 367.
2,387,845. Electroacoustic transducer. William R. Harry. 18: 237.
2,388,242. Piezoelectric transducer. John P. Arndt, Jr. 18: 514.
2,389,935. Microphonic electron tube. Jerome Rothstein. 18: 514.
2,390,488. Noise shield for acoustic devices. Edward L. Alford and Merlin L. Martin. 18: 514.
2,393,318. Microphone. Charles E. Fraser. 19: 278.
2,394,613. Apparatus for testing microphones. Henry John Houlgate and Philip David Rhodes Marks. 19: 519.
2,395,166. Transducer. Stephen B. Collins. 19: 278.
2,396,222. Sound receiving system. Leslie L. Foldy. 19: 390.
2,396,519. Electroacoustic apparatus and method of using same. Frank Massa. 19: 390.
2,396,691. Condenser-transmitter-amplifier system. Robert R. Galbreath. 19: 390.
2,396,847. Vibration elimination for service cords and conductors of electrical apparatus. Albert Morton Hathaway. 19: 391.
2,400,564. Pick-up. Bernard F. McNamee. 19: 520.
2,401,328. Sound translating device. Robert Black, Jr. 19: 520.
2,402,531. Transducer. Dean R. Christian. 19: 715.
2,403,692. Piezoelectric device. George C. Tibbets. 19: 1006.
2,404,764. Sound receiver. Harvey C. Hayes. 19: 935.
2,405,858. Acoustic coupler for condenser microphones. Harold C. Silent. 20: 79.
2,406,119. Microphone. Alfred L. W. Williams and Alfred P. Dank. 20: 80.
2,407,363. Electrical apparatus. William H. Bussey. 20: 80.
2,408,474. Noise shield for transmitter mouthpieces. Edwin B. Newman and Joseph Miller. 20: 80.
2,410,528. Microphone. Otto Soldan. 20: 357.
2,410,899. Microphone handle. Harold C. Pye. 20: 358.
2,414,489. Piezoelectric device. John E. Shomer. 20: 358.
2,416,557. Electroacoustic transducer having damping slots. Francis M. Wiener. 20: 359.
2,418,120. Face harness for microphones. Herman C. Hornickel. 20: 570.
2,418,132. Electromechanical signal translating device. Joseph P. Maxfield. 20: 570.
2,420,737. Granulated carbon microphone. Jan de Boer. 20: 571.
2,421,586. Piezoelectric device. Raymond W. Tibbetts. 20: 722.
2,421,820. Microphone. Roelof Vermeulen. 20: 721.

5.10 Navigational Instruments Using Air Sound. Altitude Measuring Instruments. Sound Ranging (for Under-Water Ranging see also 13.11n). Geophysical Prospecting

Re. 22,535. Master control for electric seismographs. Edwin J. Shimek. 16: 219.
2,238,991. Measurement of sound velocities in strata traversed by boreholes. Raymond T. Cloud. 13: 200.
2,242,953. Listening helmet for sound locators. Frank R. House. 13: 200.
2,252,849. Light and sound signalling system. John Hays Hammond, Jr. 13: 405.
2,257,187. Seismic surveying. John E. Owen. 13: 328.
2,257,859. Method and apparatus for recording waves. Esme E. Rosaire and Fabian M. Kannenstine. 13: 328.
2,260,347. Echo sounding apparatus. Donald Orr Sproule. 13: 404.
2,261,321. Seismic exploration method. Philip S. Williams. 13: 404.
2,263,519. Seismograph prospecting apparatus. Otto F. Ritzmann. 13: 404.
2,264,596. Geophysical instrument. Earley M. Shook and Robert W. Olson. 13: 404.
2,265,513. Prospecting method and apparatus. Kenneth E. Burg. 13: 404.
2,266,837. Method and apparatus for translating seismic waves. Harold F. Wiley. 13: 404.
2,267,356. Apparatus for the method of seismograph recording. Otto F. Ritzmann. 13: 404.
2,267,480. Sound direction indicator. Mancel W. Talcott. 13: 404.
2,267,858. Method of seismic surveying. Charles Hewitt Dix. 13: 403.
2,268,130. Method of geophysical investigation. Morris M. Slotnick. 13: 403.
2,271,864. Seismic wave detector. Pierre M. Honnell and Lin W. Dickerson. 14: 123.
2,272,984. Seismograph. Otto F. Ritzmann. 14: 246.
2,279,191. Method and apparatus for seismic surveying. Joseph L. Adler. 14: 124.
2,286,106. Apparatus for and method of receiving and recording vibrations. Otto F. Ritzmann. 15: 197.
2,293,288. Vibration indicator. Charles W. Gadd. 15: 197.
2,294,206. Sound transmitting means for aircraft sonic altimeters. Helmut Rehm and Hans Schuchmann. 15: 69.
2,299,620. Acoustic apparatus. G. M. Gianinni. 15: 70.
2,303,413. Seismometer. Harold W. Washburn. 15: 197.
2,304,965. Wave front indicator. Donald Orr Sproule. 15: 70.
2,309,560. Method and apparatus for measuring and recording vibrational effects. William Robertson Welty. 15: 197.
2,310,559. Vibration translating means. Cranford P. Walker. 15: 198.
2,316,616. Vibration responsive device. Frederic K. Powell. 15: 198.
2,316,915. Apparatus for amplifying and measuring small displacements. Orley H. Truman. 15: 198.
2,322,263. Electromagnetic recording mechanism. Edwin E. Turner, Jr. 15: 234.
2,324,816. Seismic surveying. William T. Born. 18: 238.
2,328,222. Geophone. Malcolm D. McCarty. 15: 234.
2,331,363. Seismic prospective system. Harold W. Washburn. 15: 235.
2,331,623. Seismic circuit. Josephus O. Parr, Jr. 15: 235.

5.10 Navigational Instruments Using Air Sound. Altitude Measuring Instruments. Sound Ranging (for Underwater Ranging see also 13.11n). Geophysical Prospecting (continued)

2,331,624. Method of and apparatus for seismic surveying. Josephus O. Parr, Jr. 15: 235.
2,331,904. Geophysical instrument. Gotthard Viktor Arnold Gustafsson and Johan David Malmqvist. 15: 235.
2,348,225. Magnetic seismometer. Olive S. Petty. 16: 220.
2,354,659. Seismic surveying. Willis Oliver Bazhaw and Josephus O. Parr, Jr. 16: 221.
2,355,421. Gravity meter. Dayton H. Clewell and Henry A. Maeder. 16: 221.
2,355,502. Signal indicator and recorder. Loy E. Barton. 16: 222.
2,355,826. Seismic prospective. Joseph A. Sharpe. 16: 222.
2,357,356. Measuring instrument and method. Olive S. Petty. 16: 222.
2,357,822. Measuring instrument. Arthur F. Hasbrook. 16: 223.
2,371,973. Geophysical prospecting apparatus. John P. Minton. 17: 161.
2,371,988. Distance measuring device. Carl-Erik Granqvist. 17: 95.
2,372,056. Method and apparatus for recording seismic waves. Robert A. Broding. 17: 161.
2,374,204. Apparatus for recording seismic waves. Herbert Hoover, Jr. 17: 162.
2,375,283. Amplification control in seismic surveying. Raymond T. Cloud. 18: 237.
2,375,433. Seismograph. John P. Minton. 18: 238.
2,375,570. Seismic detector system. Eugene McDermott. 18: 238.
2,376,185. Amplifying apparatus. Serge A. Scherbatskoy. 18: 238.
2,377,903. System for geological exploration by elastic waves. Frank Rieber. 18: 239.
2,378,555. Electric compensator. Raymond Joseph Jasse. 17: 309.
2,384,851. Method of seismic surveying. Conrad Reichert. 18: 239.
2,388,703. Geological prospecting system. Raymond A. Peterson. 18: 239.
2,390,187. Seismic surveying. Joseph Sharpe. 18: 240.
2,390,322. Seismic surveying. Josephus O. Parr, Jr. 18: 240.
2,390,328. Directional seismograph pick-up. Robert J. Roberts. 18: 240.
2,394,990. Recording system in seismic surveying. Joseph Daniel Eisler and Joseph Audley Sharpe. 19: 520.
2,395,252. Impact-operated release mechanism. Theodore H. Carpenter. 19: 717.
2,395,368. Audible indication for radar. Eric William Bull. 19: 520.
2,395,481. Seismic exploration system. Herbert Hoover, Jr. 19: 521.
2,396,722. Acoustical apparatus. Philip T. Russell. 19: 392.
2,397,746. Wave signal direction finder. Harold M. Lewis. 19: 716.
2,397,844. Signaling apparatus. Wallace W. Dewhurst. 19: 392.
2,398,411. Electronic circuit. George W. Cook. 19: 716.
2,399,386. Sound detecting system. Thomas A. Read. 19: 718.
2,399,820. Piezoelectric apparatus. Adolph R. Morgan. 19: 521.
2,400,063. Signaling apparatus. Loy E. Barton and Horace R. Dyson. 19: 521.
2,300,552. Range finder. Herbert Hoover, Jr. 19: 522.
2,400,796. Signal apparatus. Donald E. Watts and Paul C. Gardiner. 19: 718.
2,401,019. Time interval meter. Frank Rieber. 19: 719.
2,401,943. Signaling apparatus. John S. Leigh and Alexander Murdock, Jr. 19: 522.
2,403,535. Well sounding microphone. John T. Kramer. 19: 522.
2,306,391. Compressional wave directional prismatic and focusing system. Warren P. Mason. 20: 359.
2,414,695. Apparatus for locating sound sources. Frank Massa. 20: 359.
2,417,077. Seismometer. Herbert Hoover, Jr. 20: 572.
2,417,927. Sound direction finder. Gabriel M. Giannini. 20: 722.
2,422,446. Sonic direction finding. Alfred A. Stuart, Jr. 20: 572.
2,423,970. Geophone polarity indicator. Louis W. Gardner. 20: 722.

5.11 Oscillators, Electrical and Mechanical

2,395,744. Frequency changing apparatus and method. Earle L. Kent. 19: 522.

5.13 Public Address Systems and Sound Picture Installations

2,218,389. Electroacoustic megaphone. Albert Warmbier. 12: 458.
2,314,108. Electric power megaphone system. Ralph Silverman. 15: 145.
2,336,276. Method of recording and reproducing stereophonic sound vibrations. Marius Johannes Cuinirus Van Der Meulen. 16: 87.
2,348,629. Public address system. Kenneth S. Johnson. 16: 223.
2,382,848. Electroacoustic transmission plant for reproduction in places with noise disturbances. Hans Baumgartner. 17: 368.
2,392,218. Announcing method and system. Leslie J. Anderson. 19: 580.
2,397,579. Sound reproducing system. Harold J. Veritch. 19: 523.
2,402,341. Voice amplifying device. Allen L. Patterson. 19: 719.
2,411,004. Sound amplifying apparatus. Arthur J. Sanial. 20: 359.
2,419,894. Acoustic system for uniform distribution of sound. William W. Hayes. 20: 572.
2,424,069. Voice operated switch for a duplex system. Otto Tschumi. 20: 722.
2,424,634. Theater amplifying and sound distribution system. Frank Rieber. 20: 573.

5.15 Sound Level Meters. Level Recorders. Sound Pressure Measurements

Re. 22,293. System for recording a plurality of measuring magnitudes. George Keinath. 15: 145.
2,234,573. Sound intensity recorder. George Neumann. 13: 77.

5.15 Sound Level Meters. Level Recorders. Sound Pressure Measurements (continued)

2,261,573. Noise level indicator. Norman R. Stryker. 13: 405.
2,310,783. Measuring device. Johann-Georg Helmbold. 15: 145.
2,321,605. Measuring system. George Keinath. 15: 198.
2,322,708. Vibration measuring apparatus. Michael J. Burger. 15: 236.
2,395,309. Direct reading sound pressure, pressure meter. Francis M. Wiener and Robert L. Wallace, Jr. 19: 280.
2,406,816. Sound recording projectile. Lloyd A. Elmer and Clarence A. Lovell. 20: 215.

5.16 Sound Recording and Reproducing. General

2,253,186. Sound characteristic control. Donald P. Loye and Kenneth F. Morgan. 13: 405.
2,257,040. Sound apparatus. Karl Daniel. 13: 328.
2,259,467. Device for producing articulate sounds. Beulah Louise Henry. 13: 406.
2,273,866. Stereophonic sound recording reproduction. Giller Holst and Kornelis de Boer. 14: 124.
2,341,652. Process for recording by direct lithographic printing, sounds impinging on microphones or the like. Secundino Rey. 16: 89.
2,343,182. Sound recording with supersonic modulator. Frank P. Herrnfeld. 16: 133.
2,349,888. Sound recording system. Chester M. Sinnett. 16: 134.
2,354,176. Automatic reverberation control. Alfred N. Goldsmith. 16: 291.
2,369,952. Background noise suppressor. George F. Devine. 17: 162.
2,373,273. Signal recording and reproducing method. George C. Sziklai. 17: 310.
2,378,388. Recording and reproducing device. Semi Joseph Begun. 18: 240.
2,378,389. Recording-reproducing device. Semi Joseph Begun. 18: 240.
2,386,248. Means for resilient mounting of units. Manlio Marzettl. 18: 241.
2,410,329. Electrical apparatus. Robert B. Albright. 19: 523.
2,421,424. Reverberation method and system. Barton Kreuzer. 20: 573.
2,422,140. Frequency-modulated recording and reproducing system. Chester M. Sinnett. 19: 1011.

5.16d Disk Recording (including cutting and embossing)

Re. 22,183. Apparatus for recording sound on thin disks. Lincoln Thompson. 14: 247.
Des. 138,275. Phonograph stylus. Lloyd J. Andres. 16: 291.
Des. 139,584. Design for a phonograph needle. Peter L. Jensen. 17: 95.
Des. 142,052. Design for a phonograph pick-up arm. Louis J. Wronke. 18: 240.
2,243,090. Sound record. Homer W. Dudley. 13: 201.
2,247,731. Cabinet for housing sound reproducing apparatus. Harry F. Olson. 13: 201.
2,251,919. Vibration record and method of making the same. Jan Hendrik de Boer and Cornelis Johannes Dippel. 13: 405.
2,259,631. Sound recording device. Henry Flood, Jr. 13: 405.
2,284,744. Sound recording. Edward W. Kellogg. 14: 247.
2,285,079. Electromagnetic sound reproducing device. Gunther Behre. 14: 247.
2,386,178. Phonograph recorder. Otto Kornei. 14: 247.
2,286,494. Sound translating device. Roland A. Lynn and Jarrett L. Hathaway. 14: 247.
2,289,555. Sound recording and reproducing machine. Lousi J. Simons. 14: 247.
2,290,057. Sound recording and reproducing mechanism. Theodore Lindenberg, Jr. 14: 201.
2,293,723. Phonograph. Gustav F. Erickson. 15: 70
2,294,575. Pick-up arm for phonographs. Emmor V. Schneider. 15: 70.
2,294,576. Recording phonograph. Emmor V. Schneider. 15: 70.
2,294,963. Variable speed playback for sound machines. Henry Peter Clausen. 15: 70.
2,295,712. Recorder-reproducer head. William J. Brown. 14: 248.
2,295,904. Automatic pick-up head adjusting device. Yervant H. Kurkjian. 15: 71.
2,295,905. Phonograph arm and needle-carrying magazine therefor. Yervant H. Kurkjian. 15: 71.
2,296,872. Sound recording and reproducing apparatus. Barton A. Proctor. 14: 248.
2,296,870. Sound recording and reproducing. Barton A. Proctor and Ferdinand C. W. Thiede. 14: 248.
2,296,871. Index means for sound translating. Barton A. Proctor. 14: 248.
2,297,271. Galvanoplastic multiplication of sound record bands. Hugo Westerkamp. 14: 248.
2,301,616. Phonographic apparatus. Edward C. Conrad. 14: 248.
2,302,732. Sound recording and reproducing mechanism. Charles E. Yetman. 14: 248.
2,303,619. Adjustable pick-up head for sound reproducing apparatus. Ralph B. Davis. 15: 71.
2,304,633. Electric recording and reproducing system. Philo T. Farnsworth. 15: 146.
2,305,800. Process for the duplication of sound recording tapes. Hugo Westerkamp. 15: 71.
2,309,276. Sound record. Vernon L. Roberts. 15: 146.
2,310,048. Vibration translating system. Walter J. Albersheim. 15: 72.
2,310,049. Sound recording and reproducing system. Walter J. Albersheim. 15: 72.
2,310,998. Sound record and method of making the same. Edward S. Sawyer. 15: 146.
2,314,345. Phonograph device. Alphonse Cortella. 15: 199.
2,316,113. Photoelectric phonograph. Milton L. Thompson and Elmer O. Thompson. 15: 146.
2,316,637. Phonograph record scanning device. Lincoln Thompson. 15: 199.
2,316,857. Phonograph drive mechanism. Willard J. Green. 15: 199.
2,316,858. Turntable drive mechanism. Elmer O. Thompson. 15: 199.
2,318,308. Stylus head for recording and reproducing sound records. Edward Robert Harris. 15: 147.
2,320,416. Stylus for reproducers. Roy Dally. 15: 200.
2,320,429. Signal recording and reproducing system. Harold J. Hasbrouck, Jr. 15: 147.
2,320,572. Phonograph. Charles W. Dann. 15: 147.

5.16d Disk Recording (including cutting and embossing) (continued)

2,320,879. Phonograph reproducing apparatus. Oran T., McIlvaine. 15: 147.
2,322,621. Electroacoustic transducer. Frederick R. Farrow, Jr. 15: 236.
2,323,066. Apparatus for the pick-up and reproduction of sounds. Alajos May. 15: 237.
2,325,343. Sound reproducing stylus. Robert E. Semple. 15: 200.
2,325,708. Phonograph. Frank E. Runge. 15: 200.
2,325,807. Phonograph mounting. Ingo L. Stephan. 15: 237.
2,326,280. Translating device. Benjamin B. Bauer. 15: 237.
2,326,389. Phonograph stylus. Sherman E. Pate. 15: 201.
2,326,424. Phonograph stylus. Lloyd J. Andres. 15: 201.
2,326,460. Signal translating apparatus. Harold J. Hasbrouck, Jr. 15: 201.
2,326,499. Phonographic apparatus. Frank E. Runge. 15: 237.
2,326,564. Sound recording apparatus. Edward F. Rigby and Carroll E. Leedy. 15: 238.
2,326,625. Phonograph. Michael J. Di Toro. 15: 238.
2,328,478. Piezoelectric transducer. Warren P. Mason. 15: 201.
2,328,515. Phonograph turntable driving device. Marius Leonard van Overeem. 15: 201.
2,328,862. Phonograph record scanning device. Lincoln Thompson. 15: 239.
2,328,889. Sound reproducing stylus. Frank L. Capps. 15: 239.
2,329,526. Translator. Kenneth J. Germeshausen. 15: 239.
2,330,697. Acoustic apparatus. F. R. Farrow, Jr. 15: 239.
2,330,919. Electromechanical sound recording and reproducing machine. Jacob H. Rebold. 15: 239.
2,331,122. Stabilized phonograph arm. Allen Monroe Jones. 15: 240.
2,332,204. Apparatus for recording and reproduction sound. Creed M. Chorpening. 15: 240.
2,334,510. Record reproducing control circuit. Walter van B. Roberts. 15: 240.
2,336,624. Phonograph pick-up apparatus. Oran T. McIlvaine. 16: 88.
2,336,855. Electron discharge oscillation generator. George W. Fyler. 16: 88.
2,340,161. Apparatus for operating phonographs and processing records therefor. Harry R. Van Deventer. 16: 88.
2,340,806. Sound recording apparatus. Willard J. Green. 16: 88.
2,342,464. Copying sound events taken in amplitude records. Gustav Fries. 16: 89.
2,342,679. Material for records. Harald Mediger. 16: 89.
2,343,114. Recording and reproducing sound. Leopold Neumann. 16: 133.
2,343,370. Multiple-speed phonograph turntable. Richard W. Sears, II. 16: 133.
2,343,417. Phonograph pick-up. Otto Kornei. 16: 89.
2,346,597. Phonograph record and method of making. Walter H. Miller. 16: 133.
2,347,347. Vibration translating device. George R. Yenzer. 16: 223.
2,347,623. Sound record and method of making. Robert Wagner. 16: 224.
2,347,746. Cabinet for phonographs. Alexander D. Burt. 13: 201.
2,349,886. Phase modulation recording and reproducing system. Walter V. B. Roberts. 16: 134.
2,350,490. Sound recording apparatus. Herbert S. Berliner. 16: 224.
2,351,600. Laminated sound record. William R. Collings. 16: 226.
2,351,948. Sound recording and reproducing apparatus. Paul Stead Gay. 16: 226.
2,352,052. Method of producing sound band matrices. Hugo Westerkamp. 16: 227.
2,352,285. Method of making phonograph record stampers. Barton A. Proctor. 16: 227.
2,355,398. Oscillation record. Pancras Schoonenberg, Jan Jesays Hardenberg, Cornelis Johannes Dippel. 16: 292.
2,356,467. Gramophone pick-up arm. Robert Edgar Martin. 16: 292.
2,356,810. Electromagnetic translating device. Benjamin B. Bauer. 16: 292.
2,356,851. Phonographic translating device. Charles Huenlich. 16: 293.
2,357,026. Phonograph. Serge Alexander Scherbatskoy. 16: 293.
2,359,808. Phonograph. Elmer O. Thompson. 16: 290.
2,360,012. Lamp modulated recording method and system. Hillel I. Reiskind. 17: 86.
2,361,658. Sound recording and reproducing system. Chester M. Sinnett. 17: 96.
2,363,655. Tone arm. Roy Dally. 17:162.
2,364,545. Phonograph record. James W. Nell. 17:162.
2,367,846. Sound recording and reproducing apparatus. Albert W. DeSart, Sr. 17:162.
2,368,003. Mechanical-electrical sound reproducer. Georges Courcy, Marcel Paul Durand. 17:96.
2,368,198. Connection means. Walter J. Brown, Alfred L. W. Williams. 17:97.
2,369,676. Electromechanical-conversion device. Frederick Vinton Hunt and John Alvin Pierce. 17: 97.
2,369,786. Sound silencer for projectors. Jacob Miles Kuhlik. 17: 310.
2,371,373. Balanced frequency modulation system. Alexis Badmaieff. 17:97.
2,373,181. Transducer. Lawrence Fleming. 17:163.
2,373,560. Sound recording method and apparatus. John M. Hanert. 17: 97.
2,373,676. Reproducer. Kenneth J. Germeshausen. 17:163.
2,374,785. Record reproducing system. Chester M. Sinnett, Rene Snepvangers. 17:163.
2,376,456. Signal translating apparatus. Chester M. Sinnett. 17: 369.
2,379,282. Recorder. Roy Dally, Francis H. Goldsmith and David J. Munroe. 17: 311.
2,379,782. Phonograph pick-up. Lloyd J. Bobb. 17: 311.
2,380,514. Vibration-translating device. Kenneth Joseph Germeshausen. 17: 310.
2,380,845. Sound modifier. Charles Huenlich. 17: 369.
2,381,861. Translating device. Benjamin B. Bauer. 17: 369.
2,382,692. Mechanical-electrical sound reproducer. Georges Courcy, Marcel Paul Durand. 17: 369.
2,383,994. Phonograph pick-up. Graydon Smith. 18: 241.
2,385,595. Method of and device for producing sound band matrices. Arno Woitscheck. 17: 370.
2,385,945. Stylus. Francis W. Schmidt. 17: 370.

5.16d Disk Recording (including cutting and embossing) (continued)

2,386,049. Apparatus for converting sound to frequency modulated currents. Walter Hausz. 17: 371.
2,386,089. Phonograph pick-up device. Lloyd J. Bobb. 17: 371.
2,388,116. Signal translating device. Henry H. Bruderlin. 17: 371.
2,392,193. Dual speed phonograph. Emmor V. Schneider. 18: 241.
2,397,888. Signal translating apparatus. Rene Snepvangers. 18: 516.
2,399,035. Phonograph stylus. Henry L. Imelmann. 18: 517.
2,399,585. Stylus device. Elmer O. Thompson. 18: 517.
2,400,305. Electromagnetic sound recorder and reproducer. Alan Hazeltine. 18: 517.
2,400,953. Method of and system for recording audio-frequency waves. Henry E. Roys. 19: 280.
2,401,900. Sound recording composition. Horace P. Billings. 19: 280.
2,403,448. Phonograph record compositions. James S. Massarene. 19: 392.
2,403,696. Electrical sound reproducing apparatus. Harry C. Warner. 19: 280.
2,406,597. Electric pick-up. Harold T. Faus. 19: 392.
2,407,996. Stroboscopic apparatus for phonographs. William L. Nies. 19: 523.
2,408,695. Record reproducing system. Chester M. Sinnett, Herbert Belar. 19: 393.
2,412,015. Angle modulated wave reproducing system. Chester M. Sinnett. 19: 524.
2,412,718. Recorder. Roy Dally, Francis H. Goldsmith, and David J. Munroe. 19: 524.
2,413,206. Pick-up arm. Arthur F. Worsham. 19: 524.
2,413,971. Phonograph pick-up device. Ralph M. Heintz. 19: 525.
2,415,403. Vibration translating device. William S. Bachman. 19: 720.
2,415,681. Electric pick-up. Harold T. Faus. 19: 720.
2,416,082. Humless electrodynamic pick-up. Donald F. Balmer. 19: 720.
2,417,712. Signal-translating apparatus. Rene Snepvangers. 19: 937.
2,418,212. Phonographic stylus. Fred E. Williamson. 19: 940.
2,422,817. Pick-up head. Donald J. Baker. 19: 1010.
2,423,208. Electrostatic pick-up. Chester M. Sinnett. 19: 1012.
2,423,662. Phonograph pick-up device. Bruce Roberts. 19: 1011.

5.16f Film Recording (by photographic means)

2,309,857. Recording system. Livingston Middleditch. 15: 72.
2,340,562. Sound recording device. Secundino Rey. 16: 88.
2,352,032. Production of sound records. Fritz Steube. 16: 291.
2,356,664. Method of producing sound records on film. Rolf Gorisch. 16: 292.
2,369,916. Sound recording apparatus. Arthur E. Reeves. 17: 310.
2,384,131. Sound recording and reproducing system. Clifford L. Price. 17: 370.
2,385,324. Push-pull sound reproducing method and system. Alexis Badmaieff. 18: 516.
2,387,832. Reproduction of sound. John R. Cooney. 18: 241.
2,404,137. Method of and means for recording electrical impulses and impulse record produced thereby. John A. Mauer, Jr. 19: 280.
2,414,666. Photographic sound film noise reduction system. Arnold Poulsen and Axel Carl Georg Petersen. 19: 719.
2,423,285. Frequency modulation feed-back circuit for sound recording galvanometers. Alexis Badmaieff. 20: 215.

5.16m Magnetic Recording

2,264,008. Magnetic sound recording device. Arnold Stapelfeldt. 13: 405.
2,293,229. Methods and means for recording sound. Joseph B. Walker. 15: 145.
2,325,844. Magnetic recording and reproducing apparatus for use with steel bands, wires, or the like. Friedrich Ernst Fischer. 15: 237.
2,327,956. Magnetic recording and reproducing. Semi Joseph Begun. 15: 238.
2,328,539. Electromagnetic recorder. Leland B. Greenleaf and John F. Lipscomb. 15: 238.
2,335,277. Magnetic recording machine. Herman S. Heller. 16: 132.
2,349,018. Tape driving system for magnetic sound recording machines and the like. Homer G. Tasker. 16: 291.
2,351,003. Recording and reproducing of vibrations. Marvin Camras and William Korzon. 16: 224.
2,351,004. Method and means of magnetic recording. Marvin Camras. 16: 224.
2,351,005. Magnetic recorder. Marvin Camras. 16: 225.
2,351,006. Magnetic recording head. Marvin Camras. 16: 225.
2,351,007. Magnetic recording head. Marvin Camras. 16: 225.
2,351,008. Method of and means for neutralizing inductive disturbances in magnetic reproducers. Marvin Camras. 16: 225.
2,351,009. Combination oscillator coil and erasing head for magnetic recorders. Marvin Camras. 16: 225.
2,351,010. Method of and means for controlling high frequency voltage in magnetic recorder heads. Marvin Camras. 16: 226.
2,351,011. Method of and means for energizing magnetic recorder heads. Marvin Camras. 16: 226.
2,352,023. Sound reproducer. Eduard Schuller. 16: 227.
2,356,145. Magnetic sound recording and reproducing. Semi Joseph Begun. 16: 228.
2,360,625. Magnetic recording apparatus. Joseph B. Walker. 16: 293.
2,361,753. Magnetic polepiece. Stanley D. Eilenberger. 17: 96.
2,372,810. Constant speed drive for magnetic recorders. Marvin Camras. 17: 163.
2,381,463. Magnetic sound record. Ralph K. Potter. 17: 369.
2,411,849. Magnetic recorder head. Marvin Camras. 19: 523.
2,413,108. Recording and reproducing head for magnetic recording. William B. Latchford and Lynn C. Holmes. 19: 524.
2,416,279. Magnetic signal reproducing means. Semi Joseph Begun. 19: 720.
2,418,542. Magnetizing and erasing head arrangements for magnetic recorders. Marvin Camras. 19: 940.
2,419,195. Apparatus and method for magnetic recording. Semi Joseph Begun. 19: 939.
2,421,750. Magnetic wire storage unit. Danforth K. Gannett. 20: 215.

5.16m Magnetic Recording (continued)

2,423,339. Reproducing head for magnetic telegraphones. William E. Newman. 19: 1012.
2,424,295. Rotable magnetic reproducing means. Alfred L. W. Williams. 19: 1011.
2,428,002. Wire-type recording and reproducing apparatus. Edward L. Barrett. 20: 216.
2,428,449. Magnetic recording head. Marvin Camras. 20: 573.
2,431,540. Magnetic recording head. Marvin Camras. 20: 216.
2,431,541. Magnetic recording head. Marvin Camras. 20: 216.
2,432,162. Removable pole pieces for magnetic recording and reproducing heads. Cary B. Jones. 20: 574.
2,435,871. Recording and reproducing head for wire recorders. Marvin Camras. 20: 574.

5.17 Telephone. Telephone Receivers

2,236,568. Receiver cap acoustic filter. Robert C. Edson. 13: 202.
2,245,724. Voice silencer. Louis S. Scher. 13: 201.
2,298,764. Sound translating device. Albert F. Horlacher. 14: 248.
2,342,087. Ear shield and acoustic transmitting device. Edwin S. Pridham. 16: 89.
2,342,334. Variable baffle for translating devices. Frank J. Faltico. 16: 90.
2,353,070. Headphone. Roy S. Pitkin, Jr. 16: 294.
2,355,398. Sound translating device. Albert F. Horlacher. 16: 293.
2,356,262. Acoustic device. Edward E. Mott. 16: 228.
2,360,796. Electro-acoustic device. James Samuel Paterson Roberton. 16: 294.
2,371,453. Telephone unit. Charles S. Linell. 17: 164.
2,379,891. Sound translating device. Helmuth Eckardt. 18: 241.
2,381,673. Electromagnetic device. Henry Lehde. 17: 371.
2,383,832. Intercommunication system. Alfred L. W. Williams. 18: 242.
2,391,627. Transducer. Arthur S. Howell. 19: 280.
2,392,321. Desk telephone set. Ralph E. Hersey. 19: 281.
2,395,356. Vibrating headphone band. Lincoln Thompson. 19: 393.
2,400,662. Telephone transmitter and receiver. James Samuel Paterson Roberton and Michael Lawrence Gayford. 19: 525.
2,403,498. Cut-out device for telephone transmitters. Gerald E. Brittingham. 19: 721.
2,404,772. Telephone transmitter. George H. Brodie. 19: 940.
2,404,877. Sound-translating device. A. F. Horlacher. 19: 1012.
2,405,543. Telephone set. Knut Hugo Blomberg. 19: 1012.
2,408,490. Earphone socket. Stanley Smith Stevens. 20: 80.
2,408,494. Earphone socket. Paul S. Veneklasen. 20: 360.
2,408,796. Telephone instrument. Ernest S. McLarn. 20: 360.
2,414,129. Variable sensitivity sound-powered receiver. Nicholas T. Volsk. 20: 360.
2,419,497. Electromagnetic telephone receiver. Joachim Wolff. 20: 574.
2,425,061. Noise eliminator for telephone transmitters. Harry J. Hart. 20: 723.

5.19 Tuning Fork

2,247 960 Tuning fork. Simon Eugene Michaels. 13: 202.
2,302,895. Control circuit for driving forks. Leland B. Root. 14: 249.
2,348,660. Phonograph. Ingo L. Stephan. 16: 228.
2,396,224. Oscillation generator. Maurice Artzt. 19: 281.

5.21 Vibration Devices. Devices for Generating or Damping Vibrations (see also 2.8, 2.11, 4.5, 5.9, 9.6, 10.3, 13.11, 13.11n, and 13.11t)

2,154,359. Device for balancing reciprocating engines. Raoul Roland Raymond Sarazin. 17: 164.
2,313,024. Device adapted to eliminate oscillations. Francois Marie Michel Bernard Salomon. 17: 164.
2,317,090. Torsional vibration damper. Paul S. Vaughn. 16: 90.
2,328,114. Vibration amplitude and center of oscillation indicator. Ira A. Weaver and Clyde H. Phelps. 16: 90.
2,343,063. Method of and apparatus for measuring mechanical vibrations. Earle L. Kent. 16: 228.
2,356,435. Vibration damper. Raoul Roland Raymond Sarazin. 17: 164.
2,361,349. Vibration indicator. Radford K. Frazier. 17: 164.
2,363,373. Shaft vibration pick-up. Harry C. Werner. 17: 164.
2,367,709. Polyharmonic self-tuning damper means. Zachar Arkus-Dentov and George A. Rubissow. 17: 372.
2,369,077. Vibration damping suspension. Hans Joachim Seidel. 17: 165.
2,374,823. Vibration damper for suspended wires and cables. Francis E. Leib and Harold R. Wilbur. 17: 165.
2,376,317. Vibration isolator. Leon Nallerstein. 18: 242.
2,377,006. Flexible engine mount. Edward H. Heinemann and Paul A. Dennis. 17: 165.
2,378,592. Crankshaft for internal combustion engines. Otto Specht. 17: 166.
2,379,255. Vibration damper. George A. Rubissow. 18: 242.
2,380,013. Vibration damper. William F. Baukauf. 17: 372.
2,380,770. Vibration damper. Forest R. McFarland. 17: 311.
2,383,400. Vibration Damper. Forest R. McFarland. 18: 517.
2,383,516. Oscillation reducing device. F. M. M. B. Salomon. 17: 312.
2,387,065. Mounting. Lloyd E. Harding. 18: 242.
2,387,776. Oscillation reducing device. F. M. M. B. Salomon. 18: 517.
2,393,305. Centrifugal pendulum. Louis Birkigt. 18: 242.
2,393,907. Milling machine vibration damper. Charles Herfurth. 18: 243.
2,395,595. Resilient unit for operation in tension. Syril James Underwood. 18: 243.
2,396,363. Fin vibration damping means. George B. DuBois, Bert L. Madden and Fred C. Meyer. 18: 518.
2,396,540. Means for detecting and measuring torsional vibrations. Richard Stansfield. 18: 518.
2,397,132. Antiflutter and vibration device for fan and propeller blades. Fredrick R. Dent, Jr. 18: 518.
2,399,635. Torsiograph. L. F. Hope. 19: 393.
2,401,449. Resilient mounting. T. L. Yates. 19: 282.
2,403,478. Damping flywheels. Henri R. Burnat. 19: 282.
2,403,999. Sonic method for testing metal. Thomas A. Read, Herbert I. Fusfeld, and Sumner W. Kitchen. 20: 81.
2,404,581. Resilient wheel. Clarence E. Workman. 19: 282.
2,406,982. Electronic vibration detecting apparatus. Vladimir K. Zworykin and James Hillier. 19: 525.

5.21 Vibration Devices. Devices for Generating or Damping Vibrations (see also 2.8, 2.11, 4.5, 5.9, 9.6, 10.3, 13.11, 13.11n, and 13.11t) (continued)

2,408,392. Vibrometer. Donald E. Gillum and Charles J. Gallant. 19: 940.
2,411,000. Liquid type vibration damper. Albert M. Rockwell. 19: 393.
2,411,373. Torsional vibration absorber. Alfred R. Holowenko. 19: 394.
2,412,548. Torsiograph. Thomas Sidney Wilson and Richard Zdanowich. 19: 721.
2,422,960. Elimination of vibration errors in magnetic compasses and the like. Gabriel M. Giannini. 20: 890.
2,427,505. Vibration damper. Philip Newcomb. 20: 81.
2,428,293. Vibration absorbing mount. Cecil S. Robinson. 20: 891.
2,430,208. Sewing machine support. Clarence S. Best. 20: 891.
2,431,931. Engine mounting. Marcus A. Hall. 20: 891.
2,437,206. Shock absorbing device. Eldon Paul Neher. 20: 891.

6. Musical Instruments and Music

6.1 General, Unclassified

2,228,249. Tune indicating device for musical instruments. Frederick J. Alys. 12: 539.
2,241,282. Musical string. Lewis Edward Wackerle. 13: 202.
2,257,995. Musical instrument. Neil B. Abrams and William J. Mills. 13: 328.
2,322,465. Music device. Sergei Mihailoff. 15: 240.
2,326,413. Harmonic calculator. George W. Thompson. 15: 240.
2,330,261. Adjustable reed. Thomas W. Beyer. 15: 240.
2,330,441. Elastic tension cloth specifically adapted to musical instruments, air motors, and airplanes. Herman Mieth. 15: 241.
2,331,975. Melodica. Charles H. Hagopian. 15: 241.
2,332,083. Clarinet. Martin Jauch. 15: 241.
2,351,497. Musical instrument. Basil N. Fomeen. 16: 228.
2,390,237. Tuning apparatus for musical instruments. Niles Bryant. 18: 518.
2,396,250. Musical toy. James Clayman. 19: 394.
2,406,946. Music-teaching device. Floyd A. Firestone. 19: 941.

6.2 Bells, Xylophones. Other Instruments Having Rigid Vibrators

2,261,345. Electrical musical instrument for producing bell tones. Galan W. Demuth. 13: 406.
2,261,346. Electric carillon. Galan W. Demuth. 13: 406.
2,284,911. Musical instrument. L. A. Maas. 14: 249.
2,307,989. Sound signal. Kline E. Bower. 15: 148.
2,322,021. Bell. John Hengstler. 15: 241.
2,400,125. Balanced suspension for chimes. Louis A. Maas. 19: 394.
2,407,702. Sounding device. John A. Jowett. 20: 360.
2,414,656. Sound producing instrument. Milo F. Miller. 20: 360.

6.3 Brass Wind Instruments (lip vibrated)

2,234,482. Musical instrument. Forest A. Stainbook. 13: 77.
2,260,723. Piston valve for musical wind instruments. Reginald B. Olds. 13: 406.
2,273,177. Pitch modifying mouthpiece for brass wind musical instruments. Domenick Calicchio. 14: 125.
2,284,016. Wind musical instrument. Norman C. Pickering. 14: 201.
2,288,743. Wind instrument. James H. Reed, III. 14: 250.
2,302,492. Mouthpiece for musical brass wind instruments and the like. J. W. Dobie. 14: 250.
2,302,914. Wind musical instrument. Harry G. Runyon. 15: 72.
2,318,535. Mute. Charles Spivak. 15: 204.
2,320,202. Musical instrument. Josephus Thompson. 15: 204.
2,320,203. Musical instrument. Josephus Thompson and Morton S. Brockman. 15: 204.
2,358,605. Foot operatable attachment for valved wind instruments. Wiley H. Strane. 16: 229.
2,373,110. Wind instrument. Carl F. W. Forssberg. 17: 166.
2,376,453. Mouthpiece for cornets. Justin Ruettiger. 17: 166.
2,404,818. Valve action for cornets, trumpets, and like instruments. Oscar E. Swinehart. 20: 81.

6.4 Drums and Other Membranophonic Instruments

2,257,285. Apparatus and method for tuning. Edward V. Sundt. 13: 329.
2,276,846. Percussion musical instrument. Leroy J. Jeffries. 14: 125.
2,261,119. Kettle drum tuning mechanism or tympano. William F. Ludwig and Cecil H. Strupe. 13: 406.
2,285,269. Drum vitalizer. Joseph M. Grolimund. 14: 202.
2,287,138. Xylophone. Elmer Sas. 14: 202.
2,295,479. Drum snares. Le Roy J. Jeffries. 14: 205.
2,315,812. Piano-vibraphone. Gerald A. O'Connel and Carl M. Larson. 15: 204.
2,317,164. Xylophone. Harry Zimmerman. 15: 205.
2,317,165. Xylophone. Harry Zimmerman. 15: 205.
2,318,460. Maraca. Samuel Brief. 15: 205.
2,326,305. Practice drum. Thomas O. Morarre. 15: 242.
2,330,166. Xylophone. Harry Zimmerman. 15: 242.
2,331,096. Drum. Cecil H. Strupe. 15: 242.
2,338,816. Musical instruction device. Lee M. Lockhart. 16: 91.
2,339,971. Xylophone. Victor Zimmerman. 16: 91.
2,341,725. Musical instrument. Charles P. Kimmel. 16: 91.
2,347,287. Xylophone. Elmer Sas. 16: 229.
2,433,200. Percussion drum. Charles P. Cordes. 20: 723.
2,452,996. Percussion drum. Charles P. Cordes. 20: 723.

6.5 Pipe Organs

2,233,948. Electrical organ. Winston E. Kock. 13: 78.
2,259,858. Musical instrument. Ebenezer Emmet Reid. 13: 406.
2,261,999. Control for electrically operated pipe organ. Max Hess. 13: 406.
2,269,942. Electric organ. Sylvan K. Ketterman. 14: 125.
2,309,537. Key action mechanism. Albert R. Rienstra. 15: 206.
2,335,311. Multiple magnetic valve for organs. William H. Reisner. 16: 92.
2,422,940. Musical instrument. Harold M. Waage. 20: 574.

6.6 Pianos and Other Keyboard Stringed Instruments

Re. 22,247. Piano action. William G. Betz. 15: 148.
Re. 22,578. Piano. Archie Mitchell Tyson. 17: 97.
Re. 22,777. Piano action. William G. Betz. 20: 81.

6.6 Pianos and Other Keyborard Stringed Instruments (continued)

2,217,021. Piano string plate construction. Joseph Klepac. 12:539.
2,227,741. Piano action. William G. Betz. 12: 539.
2,229,440. Piano soundboard. Richard W. Carlisle. 12: 539.
2,237,695. Sounding board for pianos. Homer W. Bell. 13:78.
2,247,710. Mechanism for pianos. Arthur H. Morse, and Charles Pieper. 13: 202.
2,247,998. Piano action. Arthur Edward Healey. 13: 202.
2,252,708. Electric piano construction. William L. Douden. 13: 407.
2,253,782. Keyboard for electrical musical instruments. Laurens Hammond and George H. Stephens. 13: 406.
2,257,060. Transposing keyboard for pianos and accordions. Theodore Keir Moilliet. 13: 329.
2,258,990. Electric piano. Ernest S. Lundie. 13: 407.
2,360,387. Piano action. William G. Betz. 13: 407.
2,260,310. Piano action. James A. Gould. 13: 407.
2,260,335. Piano action. Julian C. Potwin. 13: 407.
2,260,412. Key action for musical instruments. George H. Stephens. 13: 407.
2,263,088. Piano action. Josef Hofman. 13: 407.
2,263,106. Tuning fork piano. Dickran Sebough. 13: 408.
2,263,839. Piano structure. Cyril Farny. 13: 407.
2,266,471. Piano key and action connection. Arthur H. Morse. 13: 408.
2,266,690. Piano action. Lloyd Miller Martin. 13: 408.
2,267,538. Piano action. Francis C. Socin. 13: 408.
2,267,991. Producing harmonic tones in pianos. Shinichi Ohkouchi. 13: 408.
2,287,503. Piano. Archie Mitchell Tyson. 14: 202.
2,296,698. Piano string support. Hugo Benioff. 14: 202.
2,297,717. Piano action. Julian C. Potwin. 15: 73.
2,299,656. Piano action. Julian C. Potwin. 15: 73.
2,300,012. Musical instrument. Samuel Rubenstein. 14: 250.
2,309,278. Piano action. Carl Schulze. 15: 148.
2,311,752. Piano key action testing device. Josef Hofmann. 15: 206.
2,324,037. Piano action. Francis C. Socin. 15: 242.
2,344,444. Escapement action for grand pianos. Reinhard Schulze. 16: 92.
2,338,992. Operating means for piano actions. Paul H. Bilhuber. 16: 92.
2,339,752. Piano pin block. Paul H. Bilhuber. 16: 92.
2,353,074. Piano action. Julian C. Potwin. 16: 294.
2,361,573. Piano action. Charles Frederick Stein. 16: 295.
2,367,192. Piano action. William G. Betz. 17: 166.
2,377,582. Piano. Sidney C. Shill. 17: 312.
2,383,301. Vertical piano action. Cyril Farny. 17: 372.
2,387,491. Piano construction. John W. Bethune. 17: 372.
2,411,005. Escapement action for grand pianos. Reinhard Schulze. 20: 82.
2,412,212. Vibrato producing means for musical instruments. Erving F. Gerlat. 20: 82.
2,416,225. Piano amplifier. John H. Scott. 20: 360.
2,417,277. Resonator for musical instruments. Archie M. Tyson. 20: 361.
2,417,639. Keyboard for musical instruments. Floyd A. Firestone. 20: 361.
2,417,666. Piano action. Francis C. Socin. 20: 361.
2,418,733. Piano action. Ralph W. E. Sperry. 20: 723.
2,419,174. Piano action. Francis C. Socin. 20: 723.
2,419,734. Musical instrument. Sidney C. Shill. 20: 724.
2,421,239. Piano action. Alexander P. Brown. 20: 724.
2,424,017. Piano action. Alexander P. Brown. 20: 724.
2,424,018. Piano action. Alexander P. Brown. 20: 725.
2,425,989. Piano action. Alexander P. Brown. 20: 725.
2,431,350. Piano. Charles Frederick Stein. 20: 891.

6.7 Violin Family. Stringed Instruments Except Keyboard Type

Des. 135,692. Violin. Mathew Little. 15: 206.
Des. 139,861. Design for a violin or similar article. Herbert Lee Miller. 17: 98.
Des. 140,294. Design for a violin. Edgar Garding. 17: 166.
Des. 146,148. Design for a violin or similar article. Louis G. Klages. 19: 525.
2,257,995. Musical instrument. Neil B. Abrams, and William J. Mills. 13: 328.
2,260,049. Tuning device for string instruments. Frank J. Nickel, Jr. 13: 408.
2,260,066. Musical instrument. Balthasar Vitalis. 13: 408.
2,263,793. Bow for musical stringed instruments. Frederick Woerner. 13: 408.
2,292,232. Musical instrument. Emil Liske. 14: 250.
2,299,923. Musical instrument. Otis D. Nall. 14: 251.
2,309,082. Guitar and guitar nut. William J. Smith and George H. Smith. 15: 149.
2,310,199. Stringed musical instrument. George D. Beauchamp. 15: 149.
2,310,606. Musical instrument. Paul M. Barth. 15: 149.
2,316,799. Stringed musical instrument. John W. McBride. 15: 206.
2,316,800. Stringed musical instrument. John W. McBride. 15: 207.
2,322,137. Violin string adjuster. Martin Jauch. 15: 243.
2,323,969. Stringed instrument. Clarence Biederman. 15:243.
2,327,072. Violin piano. Erick Silen. 15: 243.
2,333,013. Bow for string instruments, violins, cellos, etc. Henryk Kaston. 15: 243.
2,334,170. Process and apparatus for making gut strings. Carl B. Bjorkman. 16: 93.
2,335,244. Stringed musical instrument. Carmelo Gugino. 16: 93.
2,343,384. Multistringed musical instrument. John Isaac McDonald. 16: 134.
2,356,766. Tuning head for stringed instruments. John E. Kluson. 16: 229.
2,364,861. Stringed musical instrument. John W. McBride. 16: 295.
2,368,256. Stringed musical instrument. John W. McBride. 17: 98.
2,370,460. Tone post for violins and similar musical instruments. John Bell. 17: 167.
2,380,689. Attachment for musical string instruments. Thomas F. Goodwin. 17: 312.
2,386,899. Mute for stringed musical instruments. Russell B. Kingman. 17: 373.
2,388,550. Mute for stringed musical instruments. Russell B. Kingman. 17: 373.
2,388,551. Stringed instrument mute. Russell B. Kingman. 17: 373.
2,401,571. Harp. Richard W. Konter. 19: 1013.

6.7 Violin Family. Stringed Instruments Except Keyboard Type (continued)

2,405,316. Stringed musical instrument. John W. McBride. 20: 82.
2,405,700. Mute for stringed musical instruments. Russell B. Kingman. 20: 82.
2,414,238. Stringed musical instrument. Myron Earl Osburn. 20: 362.
2,416,854. Steel for Hawaiian guitars. Frank J. Smith. 20: 575.
2,421,567. Variable tension violin bow. William Karl Krause. 20: 575.
2,421,715. Peg for stringed instruments. Traugott Rohner. 20: 575.
2,429,138. Musical string instrument. Robert Ruf. 20: 891

6.8 Wood Winds

Des. 139,332. Design for a flageolet. Josephus Thompson. 17: 98.
Des. 139,333. Design for a flute. Josephus Thompson. 17: 98.
2,287,529. Reed of cane, plastic, or any other material for clarinets, saxophones, and like musical instruments. Mario Maccaferri. 14: 202.
2,292,767. Resonator pad for musical instruments. Albert Page. 14: 251.
2,296,737. Reed. Walter M. Peterson. 14: 202.
2,311,167. Tampion. Charles Bird Gage. 15: 149.
2,318,515. Reed. Jasper C. Nemcek, Jr. 15: 207.
2,319,419. Reed. Stephen J. Lucas. 15: 207.
2,323,138. Tuning barrel for wind instruments. Thomas T. Kearns. 15: 243.
2,328,574. Musical instrument, etc. Walter W. Mueller. 15: 244.
2,330,379. Musical instrument. Edward V. Powell. 15: 244.
2,342,836. Reed for musical instruments. Arnold Brilhart. 16: 93.
2,368,556. Mouthpiece for reed instruments. Mario Maccaferri. 17: 99.
2,374,579. Double reed. Arnold Brilhart. 17: 167.
2,375,934. Reed. Stephen J. Lucas. 17: 167.
2,382,880. High note producing system in saxophones. Venanzio Incagnoli. 17: 312.
2,388,822. Reed for musical instruments. Arnold Brilhart. 17: 373.
2,390,270. Clarinet attachment. Clinton A. Runyon, Jr. 17: 373.
2,394,143. Valve key assembly. Morton S. Brockman. 18: 518.
2,397,593. Mouthpiece for musical instruments. Arnold Brilhart. 18: 519.
2,400,592. Resonator for musical instruments. Rudolph Naujoks and William Naujoks. 18: 519.
2,411,380. Ligature for saxophone mouthpieces. Mario Maccaferri. 19: 941.
2,411,692. Instrument mouthpiece. Joseph S. Murano. 19: 394.
2,419,874. F-Bar key for saxophone. Louis E. Berkson. 20: 575.
2,425,795. Demountable valve guard for saxophones and the like. Earl J. Gillespie. 20: 892.
2,425,796. Octave valve control mechanism for saxophones and the like. Earl J. Gillespie. 20: 892.

6.9 Electrical Musical Instruments

Re. 22,321. Electrical musical instrument. Raymond C. Fisher. 15: 244.
2,216,513. Electrical musical instrument. Laurens Hammond. 12: 459.
2,219,539. Electrical piano. Herbert F. Riechers. 12: 459.
2,220,350. Sound reproducing system for musical instruments. Ellison S. Purrington. 12: 539.
2,221,097. Musical instrument. James A. Koehl. 12: 540.
2,221,188. Electrical musical instrument. Laurens Hammond and Herbert E. Meinema. 12: 539.
2,221,814. Musical instrument. Ebenezer E. Reid. 12: 540.
2,224,729. Electrical musical instrument. Laurens Hammond. 12: 539.
2,225,299. Electrical musical instrument. Galan W. Demuth. 12: 540.
2,227,068. Electrical musical instrument. Westley F. Curtis. 12: 539.
2,229,755. Electrical musical instrument. James Manatt. 12: 540.
2,229,759. Voicing panel. Valentine J. Mohler. 12: 539.
2,233,258. Electrical musical instrument. Laurens Hammond and John M. Hanert. 13: 78.
2,233,948. Electrical organ. Winston E. Kock. 13: 78.
2,234,490. Electric music instrument. Reuben S. Gilbert. 13: 78.
2,241,027. Electronic musical instrument. Ralph W. Bumstead. 13: 203.
2,241,363. Electrical musical instrument. Laurens Hammond. 13: 203.
2,245,337. Electrical musical instrument. Laurens Hammond. 13: 203.
2,245,338. Musical instrument. Laurens Hammond. 13: 203.
2,245,354. Electrical musical instrument. Mattew Z. Mroz. 13: 203.
2,250,065. Musical instrument. James A. Koehl. 13: 203.
2,250,066. Musical instrument. James Manatt. 13: 204.
2,250,258. Musical instrument. Floyd A. Firestone. 13: 203.
2,251,051. Electrical musical instrument. Laurens Hammond. 13: 203.
2,251,052. Electrical musical instrument. Laurens Hammond. 13: 203.
2,251,546. Sound amplification method and device. Herbert K. Neuber. 13: 203.
2,254,284. Electrical musical instrument. John M. Hanert. 13: 409.
2,258,241. Electrical musical instrument. Galan W. Demuth. 13: 329.
2,262,179. Musical instrument. Laurens Hammond. 13: 409.
2,262,494. Electrical musical instrument. Laurens Hammond. 13: 409.
2,266,030. Electrical musical instrument. Laurens Hammond. 13: 409.
2,285,132. Combination electric musical instrument. Paul Weathers et al. 14: 203.
2,286,587. Carillon. E. V. Sundt. 14: 203.
2,286,742. Sound-producing and sound-reproducing apparatus. E. W. Kellogg. 14: 203.
2,287,105. Electronic organ. W. F. Kannenberg. 14: 203.
2,292,757. Electronic chime system. Jarrett L. Hathaway. 14: 204.
2,293,372. Means for amplifying mechanical vibrations. Serge Vasilach. 14: 251.

6.9 Electrical Musical Instruments (continued)

2,293,499. Musical instrument. Sidney T. Fisher. 14: 204.
2,294,178. Electrical musical instrument. J. M. Hanert. 14: 204.
2,294,861. Electrical pick-up for stringed musical instruments. Walter L. Fuller. 15: 73.
2,295,524. Electrical musical instrument. John M. Hanert. 14: 205.
2,296,125. Automatic volume control for keyboard operated musical instruments. John L. Traub. 14: 205.
2,297,829. Electronic piano with pedal control. J. H. Hammond, Jr. 14: 251.
2,300,609. Electric musical instrument. V. I. Zuck. 14: 251.
2,301,869. Frequency generating system. Laurens Hammond. 14: 252.
2,301,870. Vibratory reed drive. David Hancock, Jr. 14: 252.
2,301,871. Electrical musical instrument. John M. Hanert. 14: 252.
2,302,457. Electrical musical instrument. A. H. Midgley and A. M. Midgley. 14: 252.
2,305,574. Musical instrument. James A. Koehl. 15: 73.
2,305,575. Musical instrument. James A. Koehl. 15: 74.
2,307,454. Piano construction. Galan W. Demuth. 15: 74.
2,310,429. Electrical musical instrument. John M. Hanert. 15: 150.
2,311,399. Electric piano. Walter B. La Chicotte, Jr. 15: 150.
2,314,496. Electrical musical instrument. Laurens Hammond. 15: 207.
2,318,144. Photoelectric musical instrument. Francis J. Darke, Jr. 15: 208.
2,318,935. Electrostatic alternator. Raymond C. Fisher. 15: 208.
2,318,936. Multifrequency oscillator. Raymond C. Fisher. 15: 244.
2,319,087. Electric organ keying system. Albert R. Rienstra. 15: 208.
2,321,366. Electric carillon. Galan W. Demuth. 15: 245.
2,323,231. Method and apparatus for the production of music. Frederick D. Merrill, Jr. 15: 245.
2,323,232. Apparatus for the production of music. Benjamin F. Miessner. 15: 245.
2,323,242. Electric organ system. Albert R. Rienstra. 15: 245.
2,323,392. Electrical musical instrument. Laurens Hammond and Thomas J. George. 15: 246.
2,327,720. Musical instrument. James A. Koehl. 15: 246.
2,328,282. Electrical musical instrument. Winston E. Kock. 15: 246.
2,332,076. Electrical musical instrument. Laurens Hammond and John M. Hanert. 16: 93.
2,334,744. Transducer for stringed musical instrument. Hugo Benioff. 15: 247.
2,340,001. Electrical musical instrument. Spencer W. McKellip. 16: 94.
2,340,002. Electrical musical instrument. Spencer W. McKellip and John R. Ford. 16: 94.
2,342,338. Electrical musical instrument. John M. Hanert. 16: 94.
2,343,728. Electric instrument. Victor I. Zuck. 16: 94.
2,352,438. Musical instrument. John O. Hruby, Jr. 16: 135.
2,354,699. Sound generator. Emmett L. Owens. 16: 296.
2,357,191. Electrical musical instrument. John M. Hanert. 16: 229.
2,365,566. Duophonic electrical musical instrument. Nicholas Langer. 16: 295.
2,365,567. Musical instrument. Nicholas Langer. 16: 296.
2,368,842. Musical instrument. Ylan K. Kealoha. 17: 99.
2,376,493. Apparatus for generating sound waves. Edwin H. Land and Martin Grabau. 17: 374.
2,382,413. Electrical musical apparatus. John M. Hanert. 17: 374.
2,383,553. Electrical pick-up for wind instruments. Alfred Johnston. 17: 313.
2,392,184. Electrical multiple instrument. Finia L. Phillips and Andrew J. Phillips. 17: 374.
2,401,372. Electronic musical instrument. Albert R. Rienstra. 18: 519.
2,403,090. Electronic organ. Merwin J. Larsen. 19: 1013.
2,403,664. Solo electrical musical instrument. Nicholas Langer. 19: 1013.
2,408,589. Apparatus for producing electrical oscillations. Alvin W. Wells. 20: 362.
2,413,062. Apparatus for the production of music. Benjamin F. Miessner. 20: 216.
2,414,886. Apparatus for the production of music. Benjamin F. Miessner. 20: 217.
2,426,605. Electric organ. Philip Hubert Frohman. 20: 892.
2,429,226. Electrical musical instrument. John M. Hanert. 20: 892.
2,430,717. Sound amplifying means for stringed musical instruments of the violin family. Charles Everett Hull. 20: 893.
2,432,151. Amplifying system. Laurens Hammond. 20: 893.
2,432,152. Electrical musical instrument. John M. Hanert and David Hancock, Jr. 20: 893.

6.10 Reed Organs, Accordions, Harmonicas

2,295,156. Valve and valve seat for accordions. George M. Bundy. 15: 72.
2,295,588. Musical instrument. Aldo Logli. 14: 249.
2,309,406. Musical instrument. Patrick McAuliffe. 15: 147.
2,309,714. Reed for musical instruments. Adelbert C. Radtke and Dan T. Fernandez. 15: 72.
2,310,908. Reed holder. Walter Neuerburg. 15: 148.
2,317,428. Manufacture of harmonicas. Charles E. Wetzler and Paul F. Boehm. 15: 203.
2,335,453. Chromatic harmonica. Karl Scherer. 16: 90.
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2,392,559. Dewan Chand Varma. 18: 243.
2,392,989. E. A. Kliewer, Sr. 18: 243.
2,393,184. Edward B. Passow. 18: 235.
2,393,305. Louis Birkigt. 18: 242.
2,393,318. Charles E. Fraser. 19: 278.
2,393,340. Elwyn Stanton Russell. 18: 235.
2,393,885. Frederic S. Claassen. 18: 513.
2,393,907. Charles Herfurth. 18: 243.
2,394,106. Cecil S. Robinson. 18: 513.
2,394,143. Morton S. Brockman. 18: 518.
2,394,286. Willard C. Blaisdell. 18: 515.
2,394,287. Timothy Frank Bludworth. 18: 515.
2,394,288. Timothy Frank Bludworth. 18: 516.
2,394,342. Masaichi Tominaga. 18: 513.
2,394,455. Winfield R. Koch. 19: 278.
2,394,569. Einar A. Strommen. 18: 235.
2,394,613. Henry John Houlgate and Philip David Rhodes Marks. 19: 519.
2,394,990. Joseph Daniel Eisler and Joseph Audley Sharpe. 19: 520.
2,395,166. Stephen B. Collins. 19: 278.
2,395,252. Theodore H. Carpenter. 19: 717.
2,395,309. Francis M. Wiener and Robert E. Wallace, Jr. 19: 280.
2,395,318. Joseph R. Cubert. 18: 235.
2,395,356. Lincoln Thompson. 19: 393.
2,395,368. Eric William Bull. 19: 520.
2,395,481. Herbert Hoover, Jr. 19: 521.
2,395,595. Cyril James Underwood. 18: 243.
2,395,679. Maurice F. Neuhof. 19: 391.
2,395,719. Thomas John Robert Bright. 19: 279.
2,395,744. Earle L. Kent. 19: 522.
2,395,862. Hugh B. Freeman and Bernard A. Wiener. 19: 279.
2,396,222. Leslie L. Foldy. 19: 390.
2,396,224. Maurice Artzt. 19: 281.
2,396,250. James Clayman. 19: 394.
2,396,363. George B. DuBois, Bert L. Madden and Fred C. Meyer. 18: 518.
2,396,519. Frank Massa. 19: 390.
2,396,540. Richard Stansfield. 18: 518.
2,396,691. Robert R. Galbreath. 19: 390.
2,396,722. Philip T. Russell. 19: 392.
2,396,847. Albert Morton Hathaway. 19: 391.
2,397,132. Fredrick R. Dent, Jr. 18: 518.
2,397,579. Harold J. Veritch. 19: 523.
2,397,593. Arnold Brilhart. 18: 519.
2,397,606. Robert L. Hoyle. 19: 277.
2,397,609. Ralph L. Leadbetter. 19: 277.
2,397,746. Harold M. Lewis. 19: 716.
2,397,844. Wallace W. Dewhurst. 19: 392.
2,397,888. Rene Snepvangers. 18: 516.
2,398,117. Helge Fabian Rost and Per Harry Elias Claesson. 19: 391.
2,398,411. George W. Cook. 19: 716.
2,398,432. Clifford S. Livermore. 19: 717.
2,398,701. Floyd A. Firestone. 19: 721.
2,398,815. Edwin E. Turner. 19: 717.
2,398,816. Edwin E. Turner. 19: 717.
2,399,017. Stanford Goldman. 19: 718.
2,399,035. Henry L. Imelmann. 18: 517.
2,399,386. Thomas A. Read. 19: 718.
2,399,513. Harry B. Shapiro. 19: 519.
2,399,585. Elmer O. Thompson. 18: 517.
2,399,635. L. F. Hope. 19: 393.
2,399,820. Adolph R. Morgan. 19: 521.
2,400,063. Loy E. Barton and Horace R. Dyson. 19: 521.
2,400,125. Louis A. Mass. 19: 394.
2,400,305. Alan Hazeltine. 18: 517.
2,400,552. Herbert Hoover, Jr. 19: 522.
2,400,564. Bernard F. McNamee. 19: 520.
2,400,592. Rudolph Naujoks and William Naujoks. 18: 519.
2,400,662. James Samuel Paterson Robertson and Michael Lawrence Gayford. 19: 525.
2,400,796. Donald E. Watts and Paul C. Gardiner. 19: 718.
2,400,953. Henry E. Roys. 19: 280.
2,401,019. Frank Rieber. 19: 719.
2,401,328. Robert Black, Jr. 19: 520.
2,401,372. Albert R. Rienstra. 18: 519.
2,401,411. Samuel F. Carlisle, Jr. and August B. Mundel. 19: 1002.
2,401,449. T. L. Yates. 19: 282.
2,401,571. Richard W. Konter. 19: 1013.
2,401,900. Horace P. Billings. 19: 280.
2,401,906. Clinton B. Burnett and William T. Donahue and Fred T. Randolph. 19: 518.
2,401,943. John S. Leigh and Alexander Murdock, Jr. 19: 522.
2,401,955. Harry F. Olson and Frank Hester. 19: 715.
2,402,078. Carl Peters. 18: 520.
2,402,087. P. E. Rosales. 18: 520.
2,402,341. Allen L. Patterson. 19: 719.
2,402,391. DeWitt R. Goddard. 19: 1007.
2,402,480. William A. Zarth. 19: 935.
2,402,531. Dean R. Christian. 19: 715.
2,402,697. Edwin E. Turner, Jr. 19: 715.
2,402,912. Erwin C. Osenberg. 19: 1014.
2,403,090. Merwin J. Larsen. 19: 1013.
2,403,231. Maurice Parisier. 19: 715.
2,403,232. Maurice Parisier. 19: 715.
2,403,418. John Volkmann. 19: 389.
2,403,448. James S. Massarene. 19: 392.
2,403,478. Henri R. Burnat. 19: 282.
2,403,498. Gerald E. Brittingham. 19: 721.

2,403,535. John T. Kremer. 19: 522.
2,403,664. Nicholas Langer. 19: 1013.
2,403,692. George C. Tibbetts. 19: 1006.
2,403,696. Harry C. Warner. 19: 280.
2,403,699. E. E. Wilson. 20: 217.
2,403,809. Frederick J. Lingel. 20: 79.
2,403,958. Stuart W. Seeley. 19: 1006.
2,403,990. Warren P. Mason. 19: 936.
2,403,999. Thomas A. Read, Herbert I. Fusfeld, and Sumner W. Kitchen. 20: 81.
2,403,982. Walter Koenig, Jr. 19: 1003.
2,403,983. Walter Koenig, Jr. 19: 1003.
2,403,984. Walter Koenig, Jr. and Alfred Ruppel. 19: 1003.
2,403,985. Walter Koenig, Jr. 19: 1004.
2,403,986. Lester Y. Lacy. 19: 1004.
2,403,996. Ralph K. Potter. 19: 1005.
2,403,997. Ralph K. Potter. 19: 1005.
2,404,137. John A. Mauer, Jr. 19: 280.
2,404,360. Lee G. Bostwick. 19: 938.
2,404,375. William R. Harry. 19: 938.
2,404,391. Warren P. Mason. 19: 938.
2,404,403. Michael C. Poylo. 20: 568.
2,404,581. Clarence E. Workman. 19: 282.
2,404,764. Harvey C. Hayes. 19: 935.
2,404,772. George H. Brodie. 19: 940.
2,404,784. Lee G. Bostwick. 19: 936.
2,404,785. Lee G. Bostwick and John H. King. 19: 937.
2,404,786. Lee G. Bostwick. 19: 939.
2,404,798. William R. Harry and Frank F. Romanow. 19: 939.
2,404,799. William R. Harry and Frank F. Romanow. 19: 937.
2,404,818. Oscar E. Swinehart. 20: 81.
2,404,877. A. F. Horlacher. 19: 1012.
2,405,134. Walter J. Brown and John E. Shomer. 20: 83.
2,405,179. Robert Black, Jr. and Frank F. Romanow. 19: 1006.
2,405,182. John H. Bollman. 20: 83.
2,405,185. Hugo Benioff. 19: 1007.
2,405,186. Hugo Benioff. 19: 1007.
2,405,187. Hugo Benioff. 19: 1007.
2,405,209. William R. Harry. 19: 1008.
2,405,210. Alfred H. Inglis. 19: 1009.
2,405,225. Warren P. Mason. 19: 1010.
2,405,226. Warren P. Mason. 19: 1008.
2,405,316. John W. McBride. 20: 82.
2,405,433. Henry Kock. 19: 389.
2,405,472. William Norris Tuttle. 19: 1008.
2,405,543. Knut Hugo Blomberg. 19: 1012.
2,405,604. Thomas J. Pope. 19: 1009.
2,405,605. Walter D. Goodale Jr. and Frank F. Romanow. 19: 1010.
2,405,700. Russell B. Kingman. 20 :82.
2,405,858. Harold C. Silent. 20: 79.
2,406,119. Alfred L. W. Williams and Alfred P. Dank. 20: 80.
2,406,340. Laurence Batchelder. 20: 83.
2,406,391. Warren P. Mason. 20: 359.
2,406,583. Ralph C. Blauvelt. 19: 389.
2,406,597. Harold T. Faus. 19: 392.
2,406,601. G. W. Fyler. 20: 569.
2,406,767. Harvey C. Hayes. 20: 83.
2,406,792. Hugo Benioff. 20: 84.
2,406,816. Lloyd A. Elmer and Clarence A. Lovell. 20: 215.
2,406,833. Bertram M. Harrison. 20: 218.
2,406,859. Edward W. Smith. 20: 214.
2,406,861. Earl W. Springer. 20: 218.
2,406,946. Floyd A. Firestone. 19: 941.
2,406,982. Vladimir K. Zworykin and James Hillier. 19: 525.
2,407,175. Peter Orlich, Gunther Negel and Hans Hartz. 20: 214.
2,407,240. Charles C. Barber. 20: 218.
2,407,242. Laurence Batchelder. 20: 218.
2,407,243. Laurence Batchelder. 20: 84.
2,407,244. Laurence Batchelder. 20: 84.
2,407,256. Edwin Bertram Dallin. 20: 85.
2,407,270. Bertram M. Harrison. 20: 218.
2,407,271. Harold M. Hart. 20: 85.
2,407,299. Edward W. Smith. 20: 214.
2,407,312. Finn H. Magnus. 20: 82.
2,407,328. Edwin E. Turner, Jr. 20: 85.
2,407,329. Edwin E. Turner, Jr. 20: 86.
2,407,330. Edwin E. Turner. 20: 218.
2,407,363. Edwin E. Turner. 20: 218.
2,407,363. William H. Bussey. 20: 80.
2,407,400. Clark W. Chamberlain. 19: 519.
2,407,462. Edward Oldroyd. 20: 217.
2,407,588. Leon F. Thiry. 20: 569.
2,407,643. Laurence Batchelder. 20: 86.
2,407,644. Hugo Benioff. 19: 936.
2,407,661. Bertram M. Harrison. 20: 219.
2,407,662. Harold M. Hart. 20: 87.
2,407,702. John A. Jowett. 20: 360.
2,407,996. William L. Nies. 19: 523.
2,408,028. Laurence Batchelder. 20: 87.
2,408,035. Hugo Benioff. 20: 362.
2,408,392. Donald E. Gillum and Charles J. Gallant. 19: 940.
2,408,395. James B. Hays, Jr. 20: 362.
2,408,113. Edwin E. Turner, Jr. 20: 87.
2,408,404. Laurence Batchelder. 20: 87.
2,408,458. Edwin E. Turner, Jr. 20: 363.
2,408,474. Edwin B. Newmann and Joseph Miller. 20: 80.
2,408,490. Stanley Smith Stevens. 20: 80.
2,408,494. Paul S. Veneklasen. 20: 360.
2,408,589. Alvin W. Wells. 20: 362.
2,408,695. Chester M. Sinnett and Herbert Belar. 19: 393.
2,408,796. Ernest S. McLarn. 20: 360.
2,408,816. Maurice M. Shapiro. 20: 365.
2,408,856. Carl Hussman. 19: 519.
2,409,131. William P. Lear. 20: 356.
2,409,481. Thomas B. Fordham and Thomas W. Moore. 19: 519.
2,410,065. Bertram M. Harrison. 20: 363.
2,410,066. Bertram M. Harrison. 20: 363.
2,410,067. Bertram M. Harrison. 20: 364.
2,410,112. Edwin E. Turner, Jr. 20: 365.
2,410,113. Edwin E. Turner, Jr. 20: 365.
2,410,329. Robert B. Albright. 19: 523.
2,410,413. Albert B. Hurley. 19: 518.
2,410,454. Armand V. Motsinger. 20: 357.
2,410,528. Otto Soldan. 20: 357.
2,410,749. Cecil S. Robinson. 20: 569.
2,410,805. Robert Black, Jr. 20: 365.
2,410,806. Robert Black, Jr. and Frank F. Romanow. 20: 365.
2,410,897. Erwin C. Osenberg. 20: 83.
2,410,899. Harold C. Pye. 20: 358.
2,411,000. Albert M. Rockwell. 19: 393.

2,411,004. Arthur J. Sanial. 20: 359.
2,411,005. Reinhard Schulze. 20: 82.
2,411,146. Ivan C. Clement. 20: 365.
2,411,373. Alfred R. Holowenko. 19: 394.
2,411,380. Mario Maccaferri. 19: 941.
2,411,383. Albert R. Miller. 19: 935.
2,411,537. Walter D. Goodale, Jr. 20: 365.
2,411,541. Harvey C. Hayes. 20: 366.
2,411,551. Warren P. Mason. 20: 366.
2,411,692. Joseph S. Murano. 19: 394.
2,411,849. Marvin Camras. 19: 523.
2,411,865. Lee G. Bostwick and John H. King. 20: 366.
2,411,910. Edwin E. Turner, Jr. 20: 366.
2,411,911. Edwin E. Turner, Jr. 20: 579.
2,412,015. Chester M. Sinnett. 19: 524.
2,412,212. Erving F. Gerlat. 20: 82.
2,412,234. Edwin E. Turner, Jr. 20: 364.
2,412,240. Frank W. Williams and James Clark. 20: 357.
2,412,548. Thomas Sidney Wilson and Richard Zdanowich. 19: 721.
2,412,713. George H. Burt. 19: 518.
2,412,718. Roy Dally, Francis H. Goldsmith, and David J. Munroe. 19: 524.
2,413,012. Edwin E. Turner, Jr. 20: 580.
2,413,026. Warren P. Mason. 20: 364.
2,413,062. Benjamin F. Miessner. 20: 216.
2,413,108. William B. Latchford and Lynn C. Holmes. 19: 524.
2,413,206. Arthur F. Worsham. 19: 524.
2,413,462. Frank Massa. 20: 580.
2,413,568. Albert B. Hurley. 19: 518.
2,413,936. Edmond S. Winlund. 20: 356.
2,413,971. Ralph M. Heintz. 19: 525.
2,414,123. John B. Retallack. 20: 364.
2,414,129. Nicholas T. Volsk. 20: 360.
2,414,238. Myron Earl Osburn. 20: 362.
2,414,335. Herman C. Schroeder. 19: 935.
2,414,457. Kenneth R. Eldredge and Eldred E. Edwards. 20: 580.
2,414,489. John E. Shomer. 20: 358.
2,414,656. Milo F. Miller. 20: 360.
2,414,666. Arnold Poulsen and Axel Carl Georg Petersen. 19: 719.
2,414,695. Frank Massa. 20: 359.
2,414,699. Harry F. Olson and Frank A. Hester. 20: 580.
2,414,827. Warren P. Mason. 20: 580.
2,414,886. Benjamin F. Meissner. 20: 217.
2,415,215. John H. Mayberry. 20: 357.
2,415,280. Herbert H. Fink. 19: 714.
2,415,403. William S. Bachman. 19: 720.
2,415,407. Hugo Benioff. 20: 580.
2,415,681. Harold T. Faus. 19: 720.
2,415,832. Warren P. Mason. 20: 580.
2,415,983. Felix L. Yerzley. 20: 569.
2,416,082. Donald F. Balmer. 19: 720.
2,416,225. John H. Scott. 20: 360.
2,416,225. John H. Scott. 20: 360.
2,416,279. Semi Joseph Begun. 19: 720.
2,416,314. Bertram M. Harrison. 20: 580.
2,416,324. Elias Klein. 20: 580.
2,416,452. Joseph P. Marx. 20: 217.
2,416,557. Francis M. Wiener. 20: 359.
2,416,854. Frank J. Smith. 20: 575.
2,417,077. Herbert Hoover, Jr. 20: 572.
2,417,096. Leon F. Thiry. 19: 714.
2,417,277. Archie M. Tyson. 20: 361.
2,417,347. Thomas T. Brown. 19: 714.
2,417,426. Warren P. Mason. 20: 581.
2,417,639. Floyd A. Firestone. 20: 361.
2,417,666. Francis C. Socin. 20: 361.
2,417,712. Rene Snepvangers. 19: 937.
2,417,829. Arthur C. Keller. 20: 581.
2,417,830. Arthur C. Keller. 20: 725.
2,417,927. Gabriel M. Giannini. 20: 577.
2,417,927. Gabriel M. Giannini. 20: 722.
2,418,120. Herman C. Hornickel. 20: 570.
2,418,132. Joseph P. Maxfield. 20: 570.
2,418,136. Wilden A. Munson and John C. Steinberg. 20: 578.
2,418,212. Fred E. Williamson. 19: 940.
2,418,490. Edwin E. Turner, Jr. 20: 577.
2,418,542. Marvin Camras. 19: 940.
2,418,733. Ralph W. E. Sperry. 20: 723.
2,418,846. Larned A. Meacham. 20: 579.
2,418,964. David L. Arenberg. 20: 576.
2,419,099. Alexander C. Wall. 20: 571.
2,419,174. Francis C. Socin. 20: 723.
2,419,195. Semi Joseph Begun. 19: 939.
2,419,196. Hugo Benioff. 20: 726.
2,419,197. Hugo Benioff. 20: 726.
2,419,497. Joachim Wolff. 20: 574.
2,419,603. Edward W. Smith. 20: 579.
2,419,734. Sidney C. Shill. 20: 724.
2,419,874. Louis E. Berkson. 20: 575.
2,419,894. William W. Hayes. 20: 572.
2,419,971. Herman Rumpf and Irwin J. Rumpf. 20: 568.
2,420,450. Fred Sonnen. 20: 576.
2,420,737. Jan de Boer. 20: 571.
2,421,182. Robert T. Bayne. 20: 572.
2,421,239. Alexander P. Brown. 20: 724.
2,421,424. Barton Kreuzer. 20: 573.
2,421,567. William Karl Krause. 20: 575.
2,421,586. Raymond W. Tibbetts. 20: 722.
2,421,715. Traugott Rohner. 20: 575.
2,421,750. Danforth K. Gannett. 20: 215.
2,422,446. Alfred A. Stuart, Jr. 20: 572.
2,422,683. Gustav H. Kaemmerling. 20: 78.
2,421,820. Roelof Vermeulen. 20: 721.
2,422,140. Chester M. Sinnett. 19: 1011.
2,422,337. Constantin Chilowsky. 20: 576.
2,422,817. Donald J. Baker. 19: 1010.
2,422,940. Harold M. Waage. 20: 574.
2,422,960. Gabriel M. Giannini. 20: 890.
2,423,119. John B. Retallack. 20: 726.
2,423,208. Chester M. Sinnett. 19: 1012.
2,423,285. Alexis Badmaieff. 20: 215.
2,423,339. William E. Newman. 19: 1012.
2,423,355. Paul S. Veneklasen. 20: 214.
2,423,459. Warren P. Mason. 20: 720.
2,423,662. Bruce Roberts. 19: 1011.
2,423,970. Louis W. Gardner. 20: 722.
2,424,004. Oliver Clard Terrell. 20: 570.
2,424,017. Alexander P. Brown. 20: 724.
2,424,108. Alexander P. Brown. 20: 725.
2,424,030. Harvey C. Hayes. 20: 725.
2,424,069. Otto Tschumi. 20: 722.
2,424,216. Carl Edward Atkins. 20: 570.

2,424,295. Alfred L. W. Williams. 19: 1011.
2,424,422. Raleigh E. Tresise and Paul D. Kendall. 19:1002.
2,424,634. Frank Rieber. 20: 573.
2,425,003. Ralph K. Potter. 20: 720.
2,425,061. Harry J. Hart. 20: 723.
2,425,436. Patrick McAuliffe. 20: 576.
2,425,565. Cecil S. Robinson. 20: 78.
2,425,566. Cecil S. Robinson. 20: 79.
2,425,567. Cecil S. Robinson. 20: 79.
2,425,654. Harold A. Stroch. 20: 79.
2,425,795. Earl J. Gillespie. 20: 892.
2,425,796. Earl J. Gillespie. 20: 892.
2,425,811. Earle L. Kent. 20: 889.
2,425,989. Alexander P. Brown. 20: 725.
2,426,605. Philip Hubert Frohman. 20: 892.
2,426,721. Robert T. Adams. 20: 889.
2,426,928. Paul M. Gazlay. 20: 721.
2,426,948. John Preston. 20: 889.
2,427,505. Philip Newcomb. 20: 81.
2,427,844. David Eklov. 20: 890.
2,428,002. Edward L. Barrett. 20: 216.
2,428,269. William C. Eaves. 20: 890.
2,428,293. Cecil S. Robinson. 20: 891.
2,428,449. Marvin Camras. 20: 573.
2,428,591. Games Slayter. 20: 568.
2,429,138. Robert Ruf. 20: 891.
2,429,226. John M. Hanert. 20: 892.
2,429,229. Walter Koenig, Jr. 20: 888.
2,429,236. Ralph K. Potter. 20: 721.
2,429,427. Frank Rieber. 20: 889.
2,430,208. Clarence S. Best. 20: 891.
2,430,229. Elizabeth L. Kelsen. 20: 214.
2,430,717. Charles Everett Hull. 20: 893.
2,431,350. Charles Frederick Stein. 20: 891.
3,431,540. Marvin Camras. 20: 216.
2,431,541. Marvin Camras. 20: 216.
2,431,931. Marcus A. Hall. 20: 891.
2,432,050. Leon F. Thiry. 20: 569.
2,432,123. Ralph K. Potter. 20: 888.
2,432,151. Laurens Hammond. 20: 893.
2,432,152. John M. Hanert and David Hancock, Jr. 20: 893.
2,432,162. Cary B. Jones. 20: 574.
2,433,200. Charles P. Cordes. 20: 723.
2,433,332. Hugo Benioff. 20: 364.
2,434,908. Prafulla Kumar Chatterjea and Charles Thomas Scully. 20: 571.
2,435,253. Edwin E. Turner, Jr. 20: 365.
2,435,871. Marvin Camras. 20: 574.
2,437,206. Eldon Paul Neher. 20: 891.
2,452,996. Charles P. Cordes. 20: 723.

CORRELATION OF JOURNAL CLASSIFICATION WITH PATENT OFFICE CLASSIFICATION

Listed below under each *Journal* class as described on page vii, are the Patent Office Subclasses under which the Patent Office classifies patents pertaining to the specified subject. Also listed is the number of patents which have been reviewed in the *Journal* from 1941 to 1948 which fall within each Patent Office Subclass and at the same time under the specified subject of *Journal* classification. This correlation shows, for example, that patents pertaining to frequency standards (*Journal* classification 5.7) appeared in Patent Office Subclasses 73–51, 84–455, 88–14, 116–114, 171–123, 171–327, 181–24, 250–36. Definitions of the subclasses employed in the United States Patent Office are given in the *Manual of Classification* which is obtainable from the Superintendent of Documents, U. S. Government Printing Office.

2. Architectural Acoustics

2.1 General, Unclassified

Patent Office Subclass	*Number of Patents*	*Patent Office Subclass*	*Number of Patents*
48–89	1	189–2	2
98–33	1	189–35	1
144–110	1	189–85	3
181–35	1	240–78	1
181–48	1		

2.2 Auditorium Design (see also 7.6)

20–4	2	154–44	2
72–41	1	181–30	4
72–68	1	181–42	1
98–40	1	189–85	1

2.4 Sound Absorption, Theory and Methods of Measurement of (see also 2.5)

18–48	1	106–88	1
20–3.5	2	106–122	1
20–4	10	154–28	3
20–6	1	154–44	4
25–155	1	154–45	1
72–18	2	164–125	1
72–26	1	181–0.5	2
92–39	1	181–30	1
92–55	1	181–33	1
98–33	1	189–34	1
106–18	1	189–85	2
106–31	1	260–722	1

2.5 Materials for Sound Absorption. Values of Absorption Coefficients and Acoustical Impedances.

154–44	2

2.7 Reverberation and Echoes (see also 2.3, 2.4, 2.8, 2.9 and 2.10)

181–0.5	1

2.8 Reverberation Measuring Instruments (see also 2.7 and 5.15)

181–0.5	3

2.9 Sound Transmission, Theory and Methods of Measurement of (see also 2.10)

20–4	3	154–45.9	1
20–91	1	181–31	1
72–118	1	181–33	2
106–55	1	181–46	1
134–1	1	181–50	3
154–44	5	260–723	2

2.11 Vibration Insulating Supports

154–28	1	248–22	8
188–1	3	248–26	1
248–5	2	248–358	23
248–20	2	257–261	1
248–21	2	308–184	1

2.12 Damping of Panels

20–6	1	154–44	2
72–16	1	188–33	1

4. The Ear and Hearing

4.5 Instruments Relating to Hearing, and for the Testing of Hearing (see also 5.5)

22–204	1	179–179	1
128–2.1	2	179–182	3
128–152	5	181–0.5	1
179–1	3	181–22	2
179–107	32	181–23	2
179–110	1	181–32	1
179–127	1	201–62	1
179–171	1		

Patent Office Subclass	*Number of Patents*	*Patent Office Subclass*	*Number of Patents*

5. Applied Acoustics, Instruments and Apparatus

5.1 General, Unclassified

35–17	1	172–126	1
35–25	1	177–7	8
46–178	1	177–352	1
46–180	1	177–353	1
73–67	1	179–1	5
88–14	1	181–24	1
102–26	1	234–29.5	1
116–142	1	244–1	1
116–147	2	250–36	2
128–141	1	250–41.5	1

5.2 Amplifiers and Attenuators

179–171	1

5.3 Acoustical and Mechanical Impedance Measurement (see also 11.4)

73–51	1	73–67	1

5.4 Analyzers and Filters, Mechanical and Electrical. Acoustic Filters. Oscillographs (see also 5.15)

35–1	1	178–44	3
73–51	1	179–1	9
177–386	1	234–5.6	1
178–6	1	250–157	1

5.5 Audiometers (see also 4.4 and 4.5)

179–1	3	181–0.5	1

5.5.1 Broadcasting

179–1	2

5.7 Frequency Standards, Frequency Measuring and Recording Instruments

73–51	1	171–327	1
84–455	1	172–245	2
88–14	3	179–107	1
116–114	1	179–110	1
116–137	1	181–24	2
171–95	1	250–36	1
171–123	2	250–39	2

5.8 Loudspeakers, Horns (see also 5.13 and 5.17)

95–54	1	179–109	1
113–112	1	179–110	1
115–5	1	179–115.5	12
116–142	2	179–116	2
177–7	3	179–117	1
177–386	1	179–119	1
179–1	5	181–0.5	1
179–98	1	181–27	5
179–100.4	1	181–31	9
179–108	5	181–32	4

Patent Office Subclass	*Number of Patents*	*Patent Office Subclass*	*Number of Patents*

5.9 Microphones. Vibration Microphones. Microphone Calibration Equipment (see also 13.11t)

73–51	2	179–123	2
60–380	1	179–126	1
171–209	3	179–138	4
171–327	6	179–139	2
175–339	1	179–146	1
177–311	1	179–156	1
177–327	1	179–157	1
177–351	2	179–171	1
177–352	1	179–171.5	1
177–386	3	179–175.1	1
179–1	16	179–179	1
179–104	1	179–180	2
179–107	2	179–184	1
179–110	2	179–187	1
179–111	1	179–188	4
179–115.5	5	181–0.5	3
179–116	1	181–31	1
179–121	1	181–33	1
179–122	7	250–27.5	1

5.10 Navigational Instruments Using Air Sound. Altitude Measuring Instruments. Sound Ranging (for Underwater Ranging see 13.11n). Geophysical Prospecting.

9–8	1	177–352	36
73–51	1	177–386	23
171–95	1	181–0.5	17
171–209	1	181–26	2
175–339	1	234–1.5	2
177–8	1	234–36.5	2
177–311	1	265–1.4	5
177–329	1		

5.11 Oscillators, Electrical and Mechanical

250–27	1

5.13 Public Address Systems and Sound Picture Installations

179–1	11	179–100.3	1

5.15 Sound Level Meters. Level Recorders. Sound Pressure Measurement (see also 5.4)

73–51	1	179–1	2
171–95	1	181–0.5	2
177–311	1	274–1	1

5.16 Sound Recording and Reproducing. General

46–187	1	179–100.4	4
171–95	1	179–100.41	1
179–1	2	234–1.5	1
179–100.1	2	248–22	1
179–100.2	1	274–24	1
179–100.3	1		

Patent Office Subclass	*Number of Patents*	*Patent Office Subclass*	*Number of Patents*
5.16d Disk Recording (including cutting and embossing)			
18–5.3	1	274–1	13
18–48.3	1	274–2	2
18–48.5	2	274–9	5
18–57	1	274–10	1
74–194	2	274–11	2
74–393	1	274–12	2
74–472	1	274–13	3
88–14	1	274–14	1
88–16.2	1	274–17	2
101–401.1	1	274–23	1
106–37	2	274–27	1
154–2	1	274–30	2
154–43	1	274–38	8
179–100.1	1	274–41	1
179–100.2	1	274–42	1
179–100.4	24	274–44	1
179–100.12	1	274–46	3
179–100.41	43	274–47	1
204–5	1	D26–14	3
260–16	1		
5.16f Film Recording (by photographic means)			
95–5	1	179–100.3	8
179–100.1	1	274–11	1
179–100.2	1		
5.16m Magnetic Recording			
28–71.6	1	242–55	1
179–100.2	33	274–1	1
5.17 Telephone. Telephone Receivers			
175–139	1	179–122	1
179–1	1	179–156	3
179–81	1	179–158	1
179–100	1	179–180	1
179–101	1	179–182	3
179–103	1	179–188	1
179–114	4	181–22	1
179–115.5	1	181–31	2
179–119	2	181–34	1
5.19 Tuning Forks			
84–409	1	250–36	1
179–100.41	1		
5.21 Vibration Devices. Devices for Generating or Damping Vibrations (see also 2.11 and 5.9)			
64–27	1	174–42	1
73–51	1	177–311	1
73–53	1	177–351	1
73–67	1	188–1	1
73–68	2	234–5.6	1
73–69	1	248–5	3
74–572	1	248–9	1
74–574	10	248–22	2
74–604	4	248–358	4
90–16	1	257–261	1
170–159	1	267–64	1
171–209	1	295–11	1

Patent Office Subclass	*Number of Patents*	*Patent Office Subclass*	*Number of Patents*
6. Musical Instruments and Music			
6.1 General, Unclassified			
46–177	1	84–423	1
84–170	1	84–454	1
84–297	1	84–456	1
84–312	1	84–473	1
84–330	1	84–485	1
84–363	1	117–68	1
84–382	1		
6.2 Bells, Xylophones. Other Instruments Having Rigid Vibrators			
84–405	2	116–150	1
116–148	2	116–169	1
116–149	1	177–7	1
6.3 Brass Wind Instruments (lip vibrated)			
84–292	1	84–395	1
84–330	1	84–398	2
84–387	1	84–399	1
84–388	5	84–400	1
84–390	1		
6.4 Drums and Other Membranophonic Instruments			
46–193	1	84–415	3
84–403	5	84–419	1
84–404	1	84–421	1
84–410	2	84–454	1
84–411	4		
6.5 Pipe Organs			
84–1.01	1	84–343	1
84–1.04	1	84–399	1
84–1.21	1	84–440	1
84–339	1		
6.6 Pianos and Other Keyboard Stringed Instruments			
84–1.15	2	84–238	2
84–174	1	84–239	4
84–176	1	84–240	26
84–177	1	84–253	1
84–184	1	84–376	1
84–188	2	84–409	1
84–189	5	84–423	2
84–192	2	84–428	1
84–211	1	265–2	1
84–234	1		

Patent Office Subclass	*Number of Patents*	*Patent Office Subclass*	*Number of Patents*
6.7 Violin Family. Stringed Instruments Except Keyboard Type			
D56–1	4	84–297	1
57–35	1	84–305	1
84–1.15	2	84–306	1
84–1.16	1	84–309	1
84–256	1	84–311	4
84–263	1	84–312	3
84–267	1	84–314	1
84–277	1	84–315	5
84–282	3	84–317	1
84–287	1	84–319	1
84–293	1	84–320	1
84–294	1		
6.8 Wood Winds			
D56–1	2	84–384	1
84–380	1	84–385	7
84–382	2	84–386	1
84–383	12		
6.9 Electrical Musical Instruments			
84–1.01	6	84–1.26	10
84–1.04	2	84–1.27	3
84–1.09	2	84–1.28	1
84–1.11	4	84–171	1
84–1.12	2	84–177	1
84–1.13	1	84–188	1
84–1.14	3	84–383	1
84–1.15	2	84–405	1
84–1.16	3	172–126	1
84–1.17	7	175–363	2
84–1.18	3	177–7	2
84–1.19	6	178–44	1
84–1.20	2	179–1	5
84–1.21	4	179–109	1
84–1.22	2	179–171	1
84–1.23	2	250–36	3
84–1.24	1	250–41.5	1
84–1.25	4	315–228	1
6.10 Reed Organs. Accordions. Harmonicas			
29–34	1	84–376	7
84–95	1	84–377	8
84–339	1	84–378	2
84–363	1	287–30	1
7. Noise			
7.1 General, Unclassified			
181–53	1		
7.6 Noise in Buildings (see also 2.2)			
98–87	1	181–48	1
181–35	1	181–66	1
7.7 Machinery Noise. Mufflers. Noise Silencers			
15–16	1	181–54	5
29–84	2	181–55	2
29–157.4	1	181–56	3
56–40	1	181–57	6
60–35.6	1	181–59	1
121–35	1	181–60	1
180–54	2	181–61	4

Patent Office Subclass	*Number of Patents*	*Patent Office Subclass*	*Number of Patents*
7.7 Machinery Noise (Continued)			
181–36	2	181–64	4
181–42	1	181–66	1
181–43	1	181–67	1
181–47	2	181–69	1
181–48	20	183–1	1
181–49	2	183–15	2
181–50	1	183–36	1
181–51	4	183–44	1
181–52	1	183–51	1
181–53	4	285–90	1
9. Speech and Singing			
9.1 General, Unclassified			
46–187	1		
9.6 Instruments Relating to Speech and Singing			
179–1	2	272–14	2
10. Ultrasonics (Supersonics)			
10.1 General, Unclassified			
88–14	1		
10.2 Light Affected by Ultrasonic Waves			
88–61	1	161–15.2	1
10.3 Ultrasonic Instruments			
46–179	1	116–137	1
73–67	2	177–386	1
10.5 Liquids, Ultrasonic Velocities, Dispersion, and Absorption (see also 13.2 and 13.3)			
167–78	1		
10.7 Physical Effects of Ultrasonic Waves			
73–51	1	250–1	1
183–114	1	252–314	1
10.8 Chemical Effects of Ultrasonic Waves			
202–39	1	252–349	1
11. Waves and Vibrations (see also 13)			
11.7 Theory of Waves and Vibrating Systems (see also 5.4)			
188–1	1		
13. Underwater Sound			
13.11 Instruments Relating to Underwater Sound, General			
116–27	1	177–386	4
13.11n Navigational Instruments Using Underwater Sound. Underwater Listening and Echo Ranging Devices. Sonar			
116–27	1	181–0.5	5
116–147	1	181–26	1
117–386	1	234–1.5	1
161–15	2	234–64	1
177–352	5	250–36	1
177–353	2	315–23	1
177–386	30		
13.11t Transducers for Underwater Sound. Transducer Calibration			
171–327	4	181–0.5	6
177–351	1	181–31	1
177–386	52		

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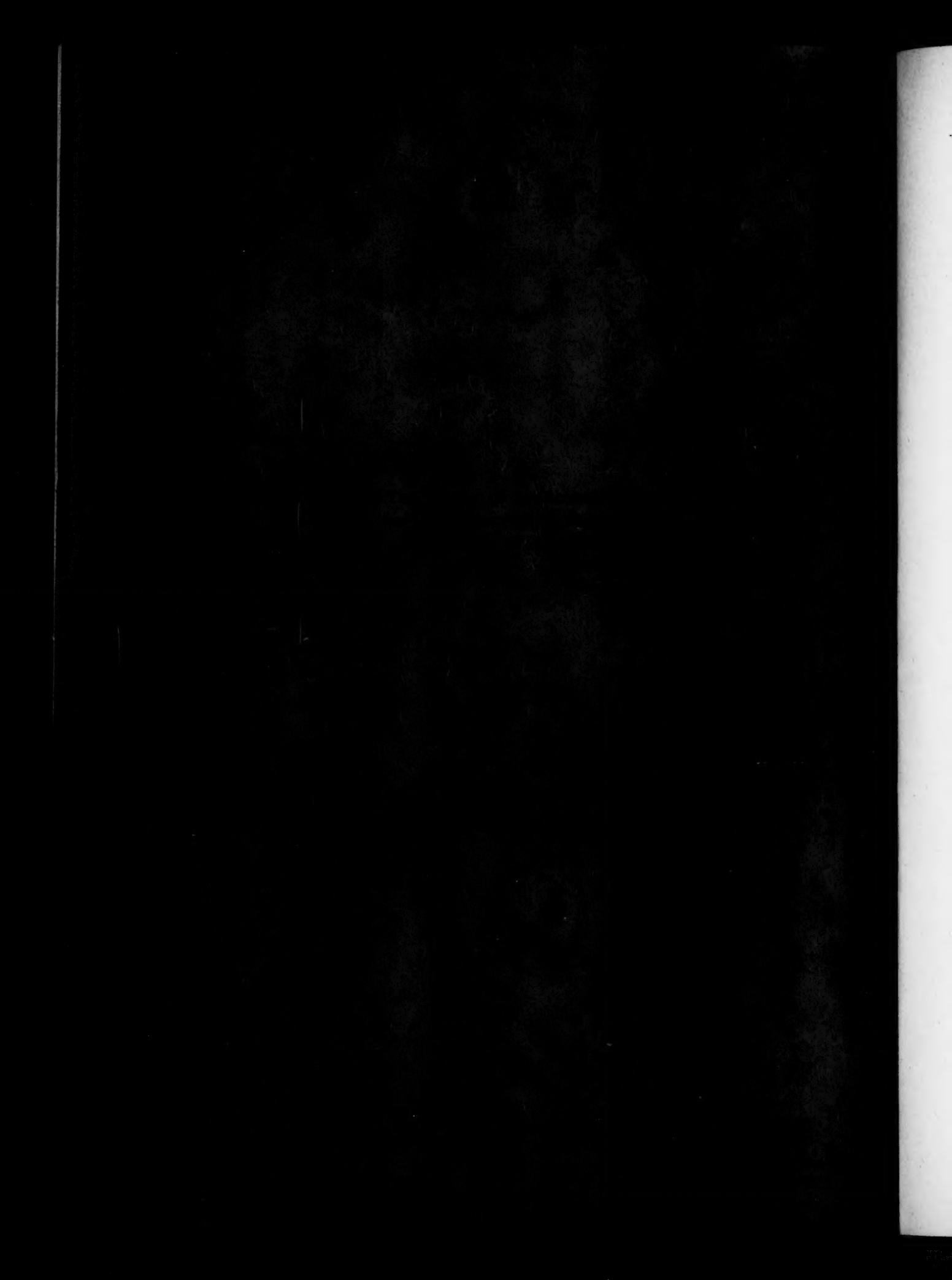
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